TCHNOLOGY DEPT.

ROADS AND STREETS

JULY, 1945

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AUG 1 1945
DETROIT

BYERS "Traveler" USES 24 TIMKEN BEARINGS

Basic machine before installation of cab, showing revolving deck with operating machinery.

Designed with postwar requirements in mind, this recently-introduced power shovel and crane embodies a new conception of excavating needs.

It is a full-circle, one-man-controlled, rubber-tired machine and is said to possess unusual mobility and flexibility of performance.

Twenty-four Timken Tapered Roller Bearings are used on all major working shafts on the upper (revolving) deck and on the axles below.

The Byers Machine Company, Ravenna, Ohio, like many other manufacturers of construction equipment, knows what Timken Bearings can do from long experience with them, hence did not hesitate to specify them for vital positions in this new shovel. The Timken Roller Bearing Company, Canton 6, Ohio.

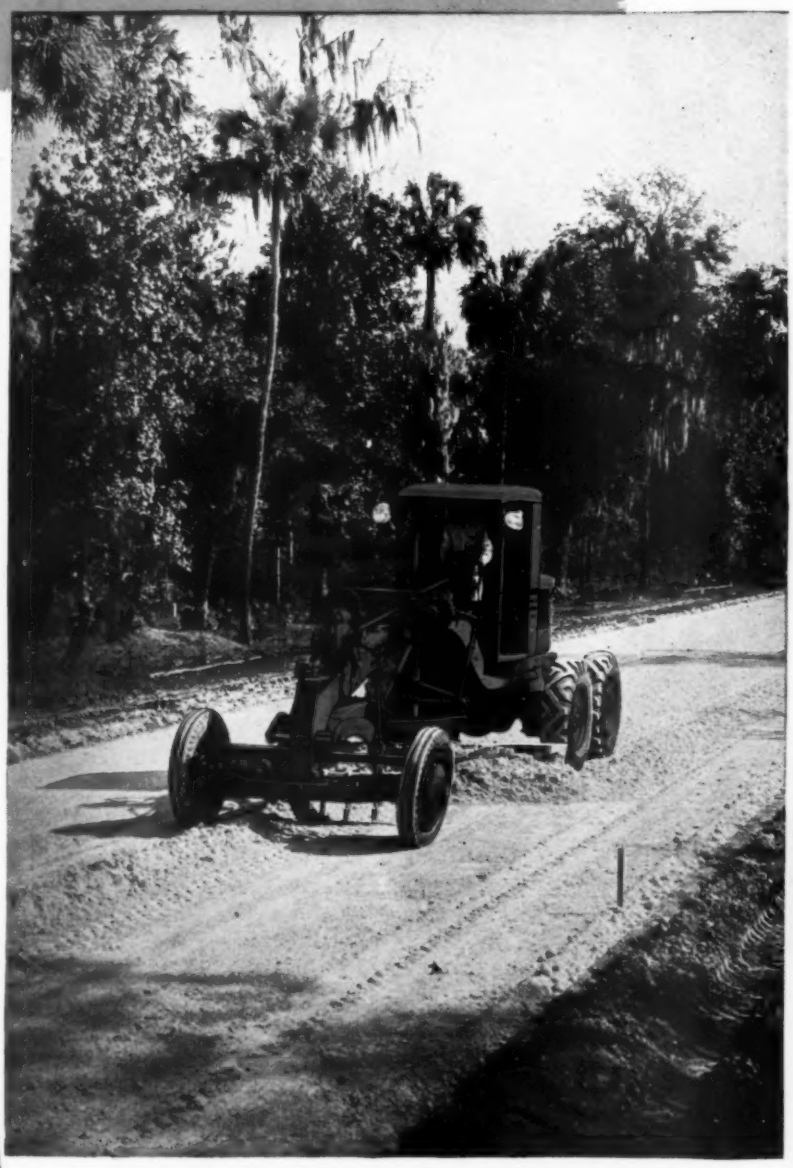
Byers "Traveler" on the job.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

SMOOTH, ACCURATE WORK... A "Cinch" with Adams

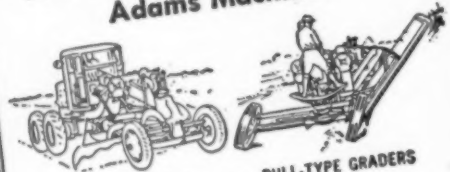


● Sound engineering design and rugged mechanical construction are absolutely essential to smooth, accurate blading and scarifying.

These important, necessary characteristics are inherent in every Adams Motor Grader: **(1)** *Balanced Weight Distribution,* assuring always-ample pressures for forcing blade and scarifier into hard materials; **(2)** *Positive-Acting Mechanical Controls,* providing fast, accurate blade and scarifier adjustments; **(3)** *Built-in Rigidity* and absence of lost motion in controls hold blade and scarifier solidly in place.

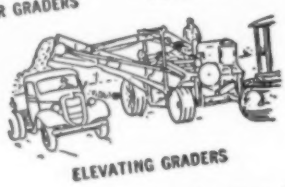
Let your near-by Adams dealer show you how these, and many other outstanding Adams features, will materially speed grading operations and reduce operating costs for you.

Ask Your Dealer About These Adams Machines



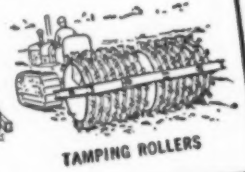
MOTOR GRADERS

PULL-TYPE GRADERS



ELEVATING GRADERS

HAULING SCRAPERS



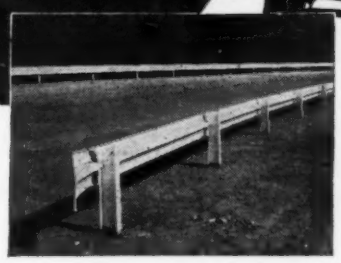
TAMPING ROLLERS

J. D. ADAMS MANUFACTURING CO.
INDIANAPOLIS, INDIANA
Sales and Service Throughout the World

ADAMS

ROAD-BUILDING AND EARTH-MOVING EQUIPMENT

How Bethlehem serves HIGHWAY BUILDERS



REINFORCING STEEL—Bethlehem Bar Mats, made of deformed bars clipped together, are easy and convenient to install, and lie flat.

HIGHWAY GUARD—Bethlehem's beam-type guard rail, called the Safety-Beam, is made in standard 12 ft., 6 in. lengths, or can be supplied in lengths up to 50 ft.

BETHLEHEM STEEL

BETHLEHEM PRODUCTS FOR HIGHWAYS

THERE'LL be a great army at work—perhaps as many as 7,000,000 men—when postwar highway and bridge building gets under way.

Your district will have its part in this big, constructive peacetime push. You may have already figured out your manpower needs, and how your logistics—the fine art of keeping supplies moving to the front—will work out.

Make Bethlehem the G.H.Q. for your road and bridge steel needs. Bethlehem can supply every one of the many steel items needed to build a modern concrete highway, and bridges. There's a Bethlehem warehouse near you, and all you'll need to do to get your complete road steel order moving fast is to put in a telephone call.

For full information get in touch with the nearest Bethlehem district office, or write direct to Bethlehem Steel Company, Bethlehem, Pa.

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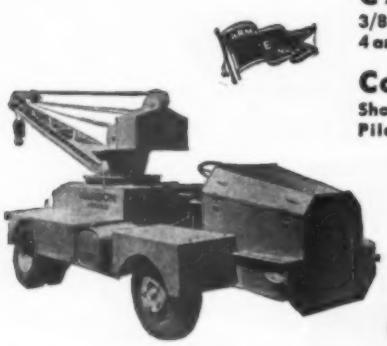
HANSON

TRUCK SHOVELS...

The records set up with Hansons on tough road building and construction jobs add up to one of the big reasons why so many successful engineers and contractors want Hansons for their post war work. The speed, low operating costs and long life of Hanson Truck-Mounted Shovels and Cranes give you that "edge" which means so much in licking tough competition.

With Hansons you know you're "all set" for the big jobs ahead. Send for full details today.



CAPACITIES
3/8 and 1/2 Cu. Yd. Shovels
4 and 6 Tons Capacity Cranes

Convertible to:
Shovel—Crane—Dragline—Pile Driver—Clamshell—Trench Hoe

YARD AND DOCK CRANES

Mobile, versatile; one man operation; 2 to 30 miles per hour; 2 to 4 ton lift and carry; full 360 degree swing. A thousand uses in fast, economical material handling. Write for descriptive literature.

THE HANSON CLUTCH & MACHINERY CO.
TIFFIN, OHIO

ROADS AND STREETS

Vol. 88, No. 7 July, 1945

A magazine devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations, and to the construction and maintenance of airports.

WITH ROADS AND STREETS HAVE BEEN COMBINED GOOD ROADS MAGAZINE AND ENGINEERING & CONTRACTING

HALBERT P. GILLETTE, President; EDWARD S. GILLETTE, Publisher; HAROLD J. McKEEVER, Editor; CHARLES T. MURRAY, Managing Editor; JOHN C. BLACK, Field Editor; LT. COL. V. J. BROWN, Publishing Director (Absent on Military Duty); H. J. CONWAY, Advertising Editor; L. R. VICKERS, Promotional Director.

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Job-Tested Proof that Lorains Are Money-Makers in Rock . . .

A 3,000,000 ton payload of crushed rock in a single year. That's the story of Lorain performance and production on this quarrying operation* where each of five 2 yd. Lorain 82's averaged over 50,000 tons of rock a month for twelve consecutive months.

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Keep the 2 yd. Lorain 82 (with hydraulic clutch) in mind for those jobs where big production means bigger profits. For complete details get in touch with your Lorain distributor, now!

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In addition to the low cost of fast heat producing Atomizing Low Pressure Burner the Continuous Heat Flue System developed by Littleford forces the heat through *seven complete passes* through the tank. This eliminates hot spots and gives uniform heat throughout the tank.

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There is no better assurance of the kind of service you want than the repeat order purchases of contractors like B. Perini & Sons, Inc. of Framingham, Mass.

Northwest Shovels, Cranes, Draglines and Pullshovels have always been repeat order machines and even in this day of priority buying, Northwest sales are largely repeat orders to customers of long standing.

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For LOWEST NET COST PER YARD
TOURNAPULLS are the answer

on airports • •

When Circle Construction Corporation found that Tournapulls could lick tough Long Island sand on the New York Idlewild Airport, they built up their Tournapull fleet to 13,—with them, are moving 80% of their 2,500,000 cu. yd. contract. Time studies show Tournapulls average 84 pay yards per hour on 2600′ one-way hauls, 69.6 on 3600′, and 66 on 4200′ hauls. Tough airport jobs like this have proved Tournapulls are the answer.

• • on roadwork

Raemisch-Madden Co. used 11 Tournapulls to handle both grading and graveling on 13 miles of U.S. 66 near Chenoa, Ill. On 47,000 yards of sub-base, wet pit-run gravel was loaded, hauled 3 miles over pavement and spread in 4 to 6" lifts with Tournapulls. Each unit averaged 25 pay yards, loaded, hauled and spread in place per hour. On 400,000 yards of grading, when dirt was wet and spongy, Tournapulls averaged 55 pay yards per 50-minute hour on 3900′ one-way haul. For roadwork Tournapull speed is the well-known answer.

LETOURNEAU

PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

JOB-PROVED Over 3200 Built and Shipped

TOURNAP

on levees

Constructora del Sur is using 2 Tournapulls to build 2½ miles of select earth levee with very little sand content near Suchate, Mexico. This, in a country made up largely of sand, requires stripping sand overburden from small scattered earth seams. Next, earth is hauled and spread on the dike in uniform 8" layers. On this job Tournapulls tripled the output of similar capacity crawling tractor-scraper combinations.

on reservoirs

Peter Kiewit Sons Company used 3 Super C Tournapulls on this 600,000-yard reservoir job near Des Moines, Iowa. Working in moist, sandy clay, each unit loaded in 50 to 60 seconds, averaged 3,000-foot cycles every 6 minutes, delivered 120 pay yards per 60-minute hour. Tournapulls are the low-cost dirt-moving answer for your water control contracts.

on stripping

C. Arrington replaced a shovel and four 3-yd. trucks with 2 Super C Tournapulls on iron mine near Cedartown, Ga. These mobile rigs locate and strip ore pockets, load the ore, haul and dump to grizzly. Return grades run to 14%, average 10.5%; hauls vary from 1/2 to 4/10 mile one way. Ability to sample, strip or load ore — anywhere at any time — is a big Tournapull advantage on mining jobs like this.

on railroad grading

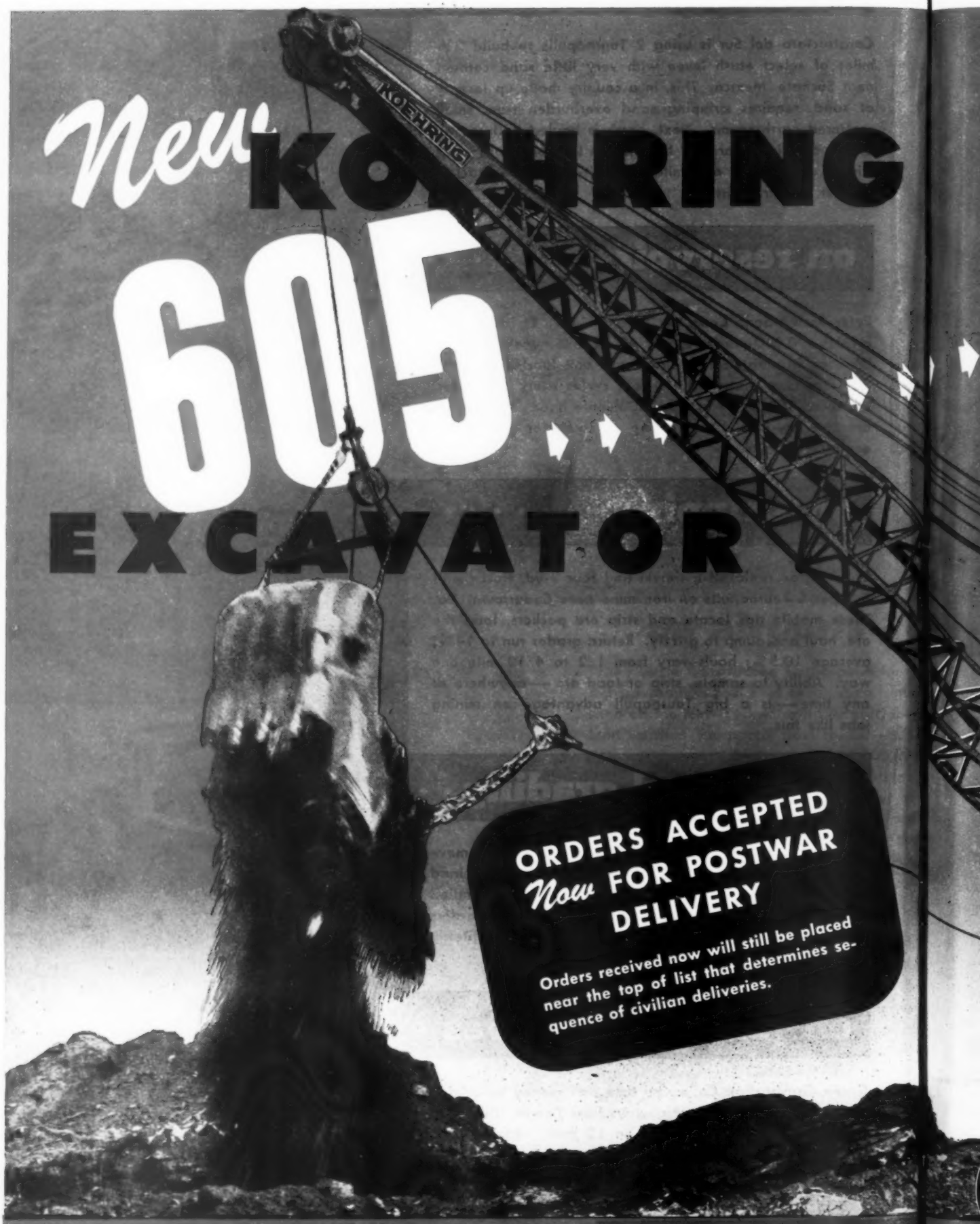
Here is another Kiewit job — 6 Tournapulls helped move 2,300,000 cu. yds. on a 23-mile relocation of Rock Island line between Perlee and Eldon, Iowa. Material handled was typical wet, sticky Iowa gumbo. Kiewit's repeat orders prove that they have found Tournapulls are the profitable answer for all types of earthmoving.

on job-to-job moves

Green Construction Co. saved time and money by driving 5 Tournapulls over state highways from Peoria, Illinois, to Oaktown, Indiana, 205 miles, in 13 hours' driving time. For hauling dirt on or over pavement and for economical job-to-job moves, Tournapulls with their big (5'6") rubber tires, are the answer.

APULLS

Tournapulls have repeatedly proved their profit-making ability in all these fields by: (1) adaptability to all haul distances, (2) high speed for quick completion, (3) ability to profitably handle large or small jobs, (4) hauling over pavement. Let your LeTourneau distributor show you why all these cost-cutting advantages make Tournapulls your best bet for lowest net cost per yard. See him TODAY.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EXCAVATOR
ORDERS ACCEPTED
Now FOR POSTWAR
DELIVERY
Orders received now will still be placed near the top of list that determines sequence of civilian deliveries.
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New KOEHRING 605

POSTWAR 1½-YARD EXCAVATOR and 25-TON CRANE

Be among the first to earn greater profits with the new, designed-for-tomorrow 605, latest, but not the last, addition to the Koehring Postwar Line. New ideas in Heavy-Duty excavator design, tested and proven. Plus outstanding, exclusive advantages of earlier Koehring excavators. Greater operating ease. Higher production. More engineered-in strength. Order your Koehring 605 today to get earliest possible delivery.

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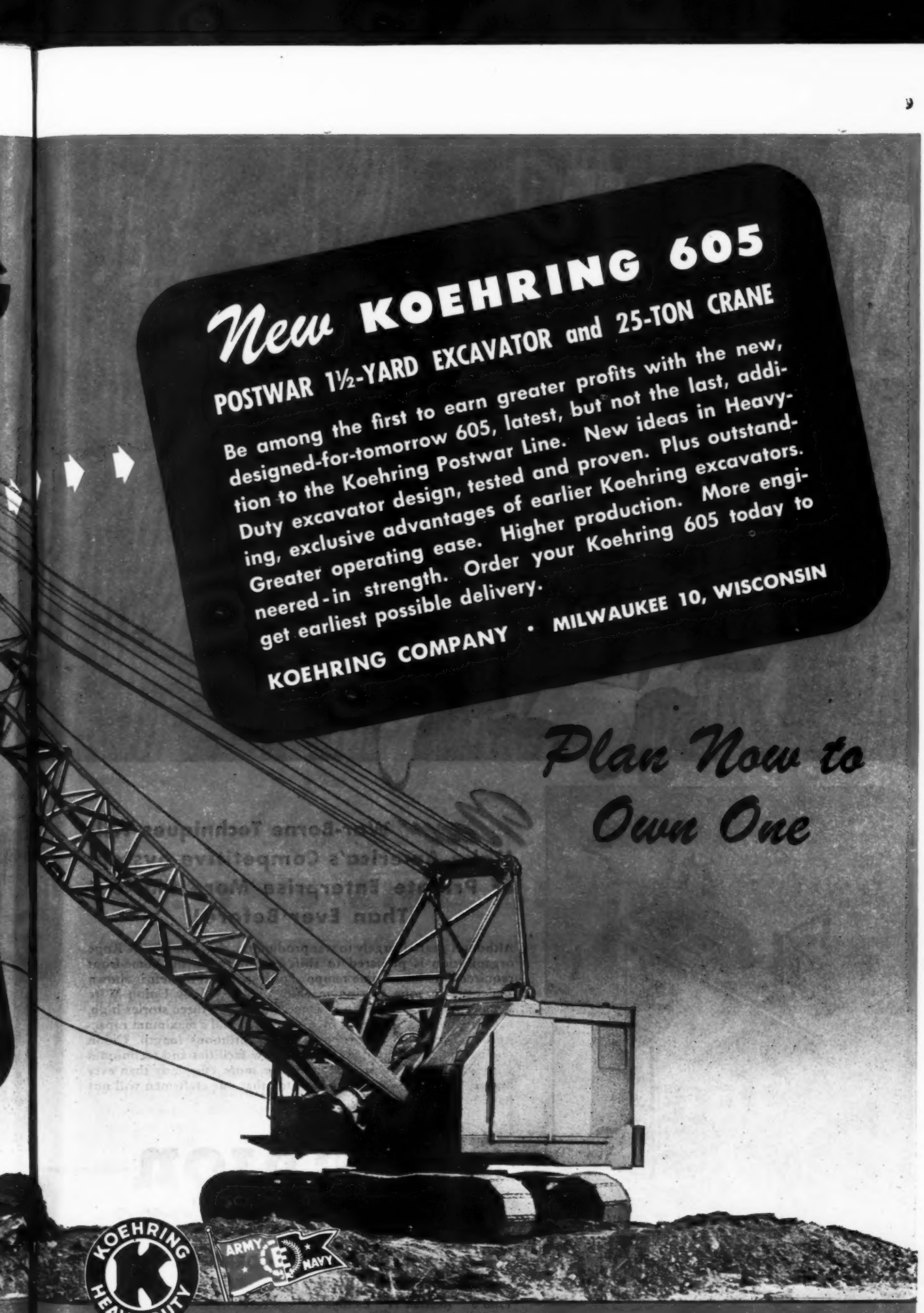
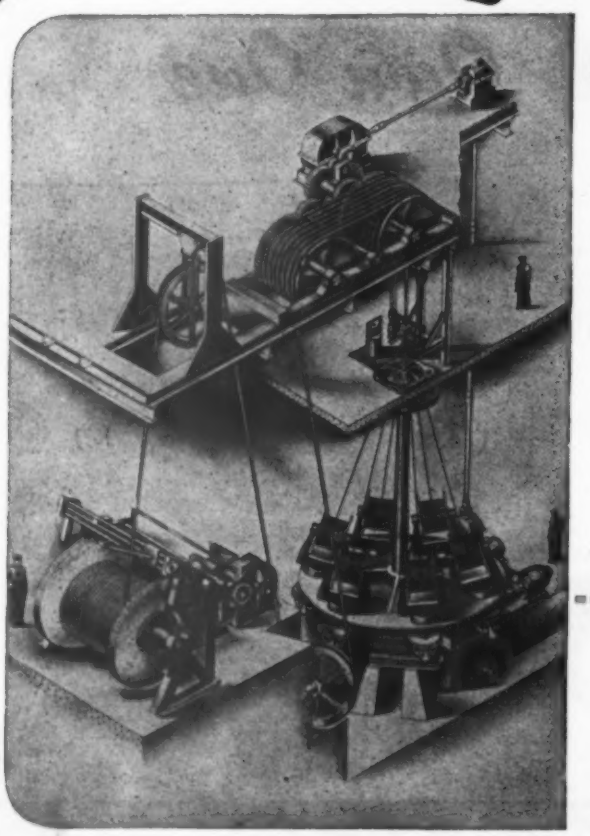


HEAVY DUTY CONSTRUCTION EQUIPMENT

WHICH WILL BUILD ROADS . . .

NO PROVISIONS MADE FOR FUNDS
NO PLANS OR PROGRAM
UNITED STATES OF COMPLACENCY
HEADING FOR FEDERAL PREEMPTION INSTEAD OF FEDERAL COOPERATION



New War-Borne Techniques Will Make America's Competitive System of Private Enterprise More Efficient Than Ever Before!

Although geared largely to war production, the Union Wire Rope organization is prepared to shift overnight to fill home-front requirements in wartime tempo. For instance, at the left is shown a giant wire rope closing machine developed by Union Wire Rope engineers in the war emergency. It is three stories high, has a range of ⅜ inch to 4 inch wire rope and a maximum capacity of 27 tons of wire rope in one continuous length. Union engineers have devised many other new facilities and techniques with which to serve private enterprise more efficiently than ever before. Our war work has been such that our craftsmen will not have to relearn their skills.

union *Wire Rope*

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Let's pull together

FOR THIS KIND OF AN AMERICA

Americans have called upon their national leaders for a far-reaching highway system, a network of airports, and a long-studied program of flood control and land conservation. Why? Because they are the keys that will open new frontiers and because they are among the few proper and fertile fields for the investment of public funds.

Our leaders in Congress have responded by approving our largest highway and flood control programs and doubtless will respond with an airport program.

But, the approved programs are not being pushed to final*ization* in many states. The National Highway Program, for example, is based upon state responsibility for plans by State Highway officials and funds by State Legislatures. No citizen can afford to let this sound program go by default. If there is a lag in your theatre of operations, make it your concern. Send the coupon for "The Road Ahead", published by the American Road Builders' Association, and "Put Your Town on the Air Map", published by the Personal Aircraft Council of the Aeronautical Chamber of Commerce of America.

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D-45

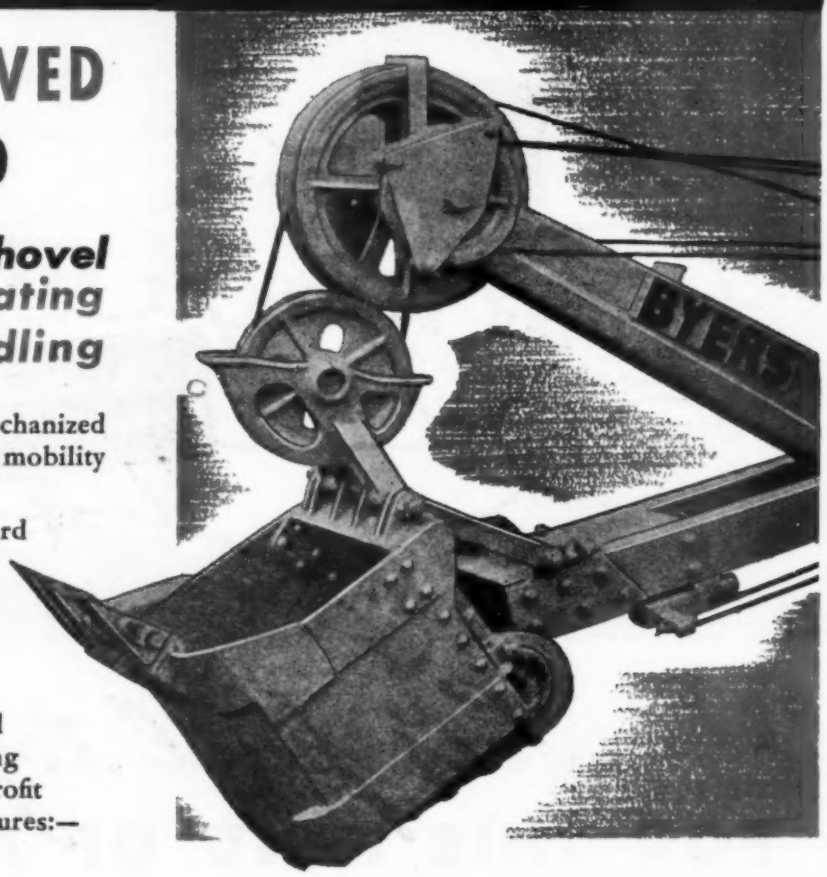
TOMORROW'S SHOVEL

TESTED • PROVED APPROVED

Soon available to shovel users . . . for excavating and material handling

The speed required in mobile, mechanized warfare now results in new speedy mobility for power shovels and cranes.

Here is Byers "Traveler", a half yard shovel (convertible to all attachments) which sets new high standards for efficiency, output and performance. Until recently available only on high priorities . . . soon available to all shovel and crane users for general excavating and material handling. You can profit with the following outstanding features:—



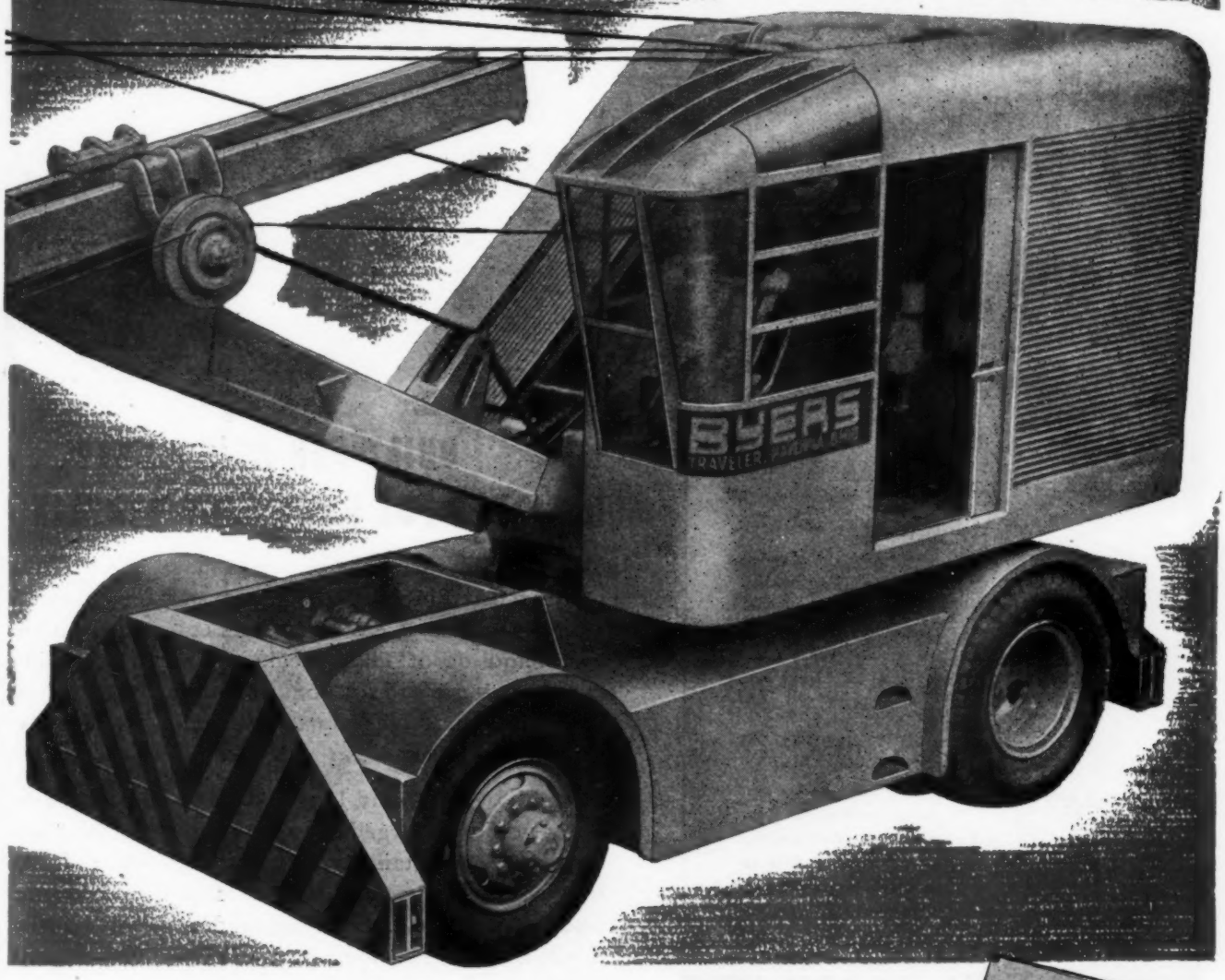
1. **Self Propelled . . . around the job or on the highway.**
   ELIMINATES TRAILER
2. **One man operated . . . All controls conveniently grouped for operating or steering by the one operator.**
   ELIMINATES SECOND MAN
3. **4-wheel drive . . . 6 wheel traction, mud grip tires.**
   SPECIALLY ENGINEERED CHASSIS
4. **Digs all around . . . Over front, sides, back.**
   A FULL CIRCLE MACHINE
5. **Air controls, hydraulic brakes. Power steer.**
   NOT AN "OLD" DESIGN MODERNIZED
6. **New smooth "Airflex" cool internal expanding clutches.**
   FREE FROM ADJUSTMENT AND REPAIR
7. **Enclosed gears running in flowing oil.**
   EFFICIENT, CLEAN, LONG-LIVED

Inquire Today for Descriptive Booklet. FREE

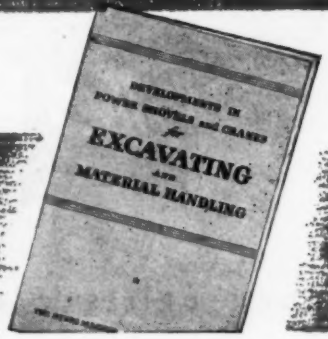
BYERS HALF YARD TRAVELER

IS HERE *Today!*

Tomorrow's shovel needs no trailer to carry it from job to job . . . it carries itself at truck speeds.



***INQUIRE TODAY** for this valuable booklet that tells what to look for in any new shovel or crane you buy*



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RAVENNA, OHIO

Distributors Throughout The World

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WITH

Thor

PAVING BREAKERS

No. 25 Heavy Duty Thor Paving Breaker

THOR FEATURES THAT SPEED UP HEAVY DEMOLITION . . .

4-BOLT BACK HEAD

Gives maximum strength and rigidity when prying or when leverage action is applied to the breaker.

LATCH-TYPE RETAINER

Simple, efficient. A spring detent holds latch retainer in closed position. Operator has only to press down on retainer with his foot to insert or release tool.

POSITIVE, SHORT-TRAVEL TUBULAR VALVE

This actuates a block-type piston, minimizes vibration and makes machine easier to handle. Also assures reliable performance with low air consumption.

BUILT FOR HEAVY DUTY . . . DESIGNED FOR FAST, EASY HANDLING

Thor Breakers pack the power to make fast work of toughest demolition jobs—pavements, walls, columns, piers, foundations, etc. Operators enjoy the smooth, easy handling of Thor Breakers that is due to improved balance and freedom from unnecessary vibration. Together, these features assure more work in less time with less effort—*at a definite saving in job costs.*

Strength, rigidity and longer life are guaranteed by alloy-steel drop-forged construction . . . Thor Breakers have the extra stamina and capacity to handle the toughest jobs day after day at minimum operating and maintenance costs. "Measured air"—an exclusive Thor feature—provides maximum power for peak efficiency.

For complete information about Thor light, medium and heavy duty paving breakers and other Thor contractors' tools, write for Catalog 42-A.

Thor PORTABLE Electric & Pneumatic TOOLS

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STEPPING FROM AUTO TO TRUCK OR BUS

DOESN'T INCREASE A MAN'S STRENGTH OR STATURE

◐ Since Gemmer pioneered ease of steering, the vast majority of passenger cars have it. A truck or bus driver gets used to it in his own car.

◐ But when this driver steps into the cab of a truck or bus having ordinary steering, he has to be ready to exert greatly increased effort on the steering wheel.

◐ He cannot be expected to grow in the act of changing from his car to truck or bus. Gemmer Steering MAKES CERTAIN HE DOES NOT HAVE TO — the vehicle so equipped has passenger car ease of steering. It is quite natural that Gemmer equipped vehicles are preferred by drivers. Fleet owners and operators prefer vehicles so equipped because decreased driver fatigue makes for quicker trips, fewer accidents.

◐ Gemmer Steering Gears are simple, efficient, sturdy. An hour glass worm mounted on roller bearings bears on gear teeth that roll. Roller tooth and roller bearings banish friction, minimize wear. There is no lost motion; rarely, if ever, need for maintenance. Steering is always firm, responsive, positive, with absence of rubbery feeling or wander.

◐ *GEMMER... The Symbol of Steering Excellence*

STEERING WON'T PUT EXTRA DEMAND ON THE DRIVER IF IT IS

GEMMER STEERING

GEMMER MANUFACTURING CO., 6400 MT. ELLIOTT, DETROIT 11, MICH.

Husky CLEVELAND PAVING BREAKERS

Help Finish the Fight! Buy MORE War Bonds and Stamps!

☆ The complete Cleveland line includes the *right* model for *every* job—whether it's paving breaking, demolition work, frost breaking, ripping up foundations or masonry, breaking shale and hard ground, etc. Make your choice from: (1) The 80 lb. C7, best for average work; two run from a No. 85 compressor. (2) The 82 lb. C7, a slugger for the hardest work; two run from a No. 85 compressor. (3) The 35 lb. C10, a smaller tool for lighter work; three run from a No. 85 compressor. (4) The 58 lb. C11, with long stroke and heavy, slugging blow. Two run from a No. 85 compressor. All these Cleveland models have *always* been air cushioned.

To help you further there are "Cleveloy" *armor-plated* chisels, moils and tools; durable "Veribest" air hose and Cleveland quick-acting hose couplings.

Write for Bulletin 128 on Cleveland Paving Breakers

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Birmingham 1, Ala.	Lexington 19, Ky.	Salt Lake City 1, Utah
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The Cleveland Rock Drill Co.

Division of the Cleveland Pneumatic Tool Company

CLEVELAND 5, OHIO

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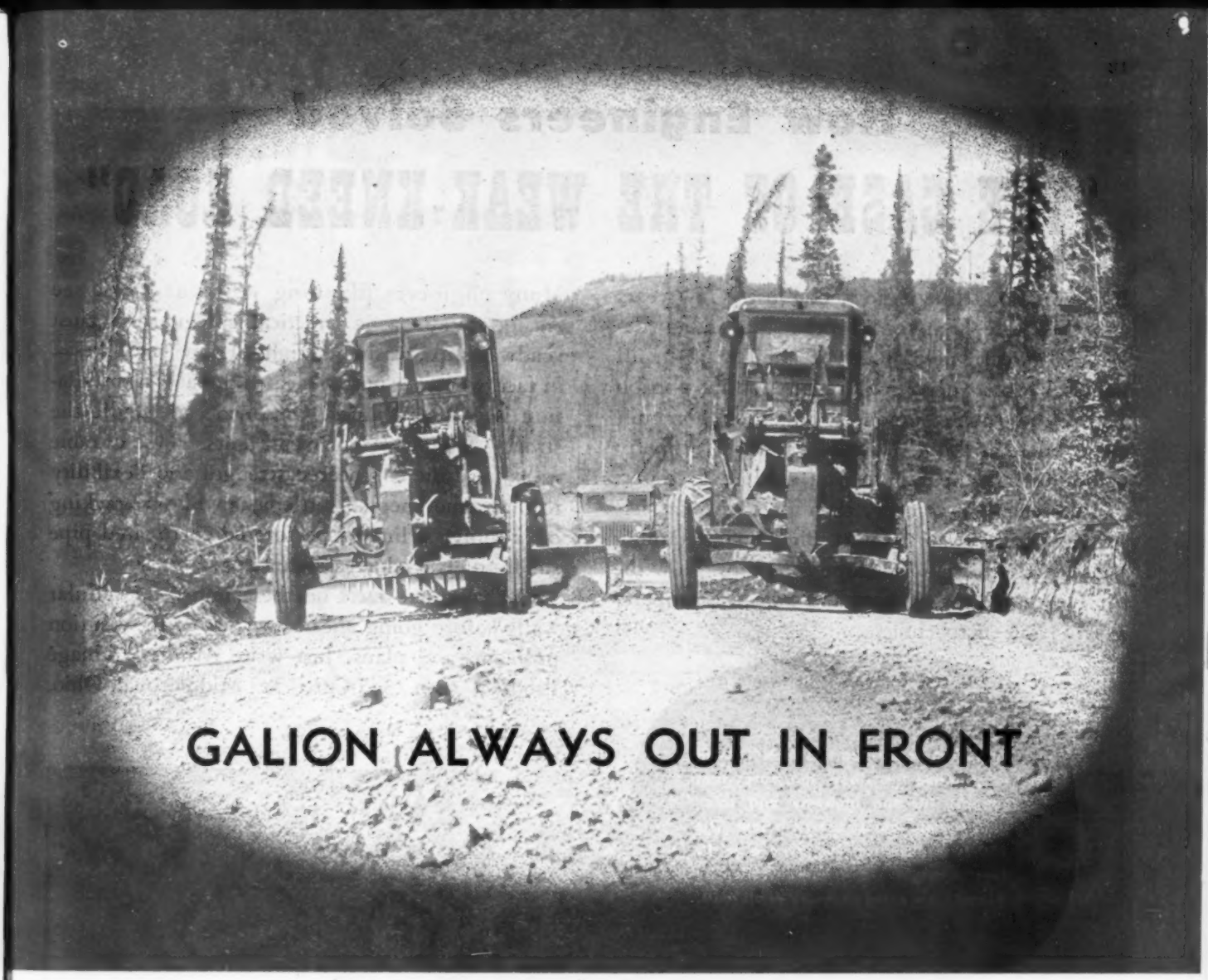
★ LEADERS IN DRILLING EQUIPMENT ★



BE SURE OF "MORE MILES PER GALION" IN ROAD AND AIRPORT CONSTRUCTION

Galion motor graders are built to take a lot of punishment . . . have done so on thousands of jobs on many fighting fronts. This same stamina and resourcefulness is again available for the heaviest kind of work in road and airport construction . . . on those contemplated projects in this country now. Remember Galion . . . and be sure that job will be completed on time.

MOTOR GRADERS – ROLLERS – SPREADERS

The GALION IRON WORKS & Mfg. Co.

Main Office & Works: Galion, Ohio

Distributors in Most Large Cities.

How Engineers Solved

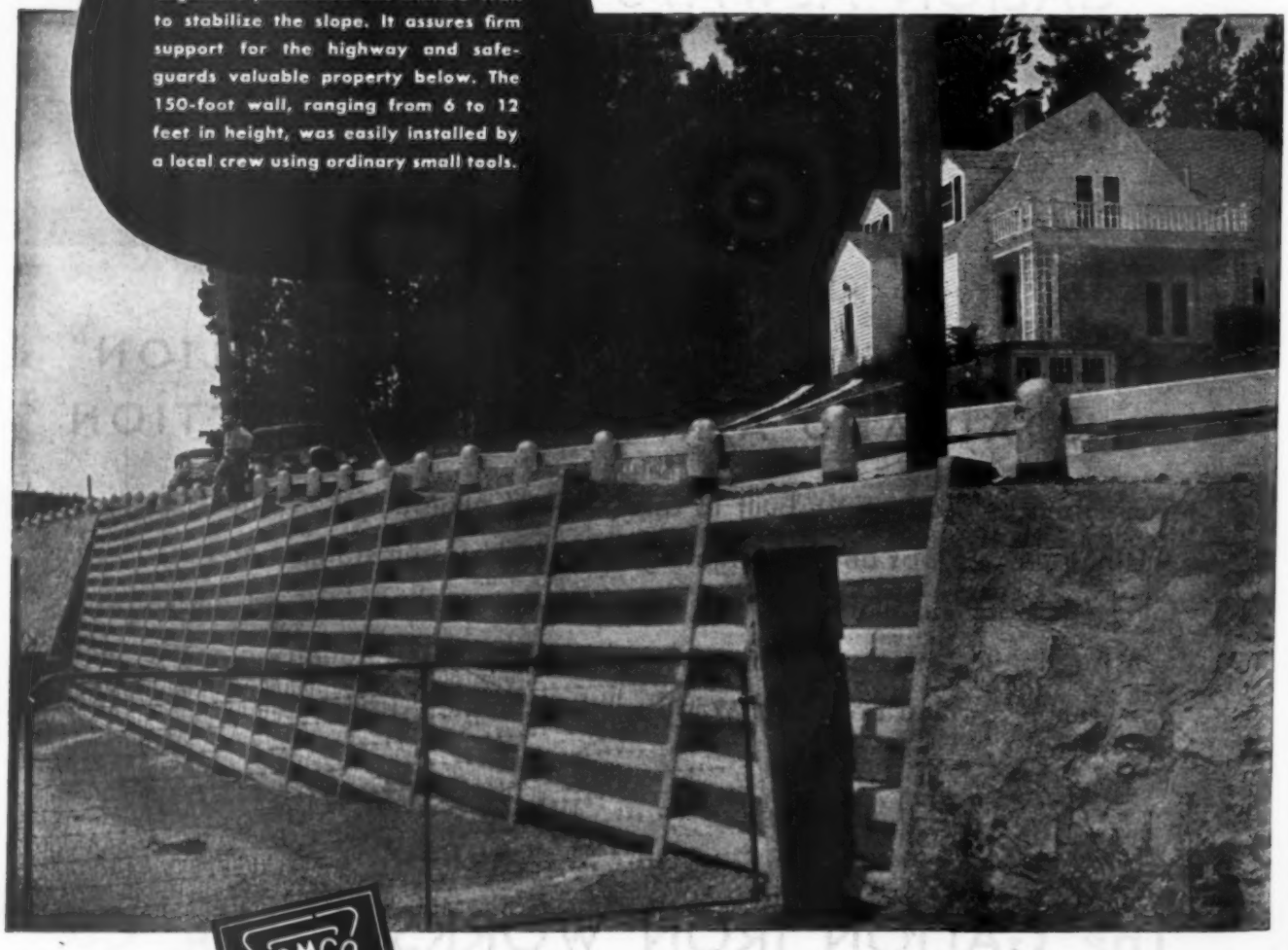
"THE CASE OF THE WEAK-KNEED ROAD"

It doesn't look like it now, but just a few years ago this state highway in Lead, S. Dakota, developed "weak knees." Lack of stability of the fill material caused excessive pressure, and a portion of the old rubble masonry wall, though rebuilt once, failed to hold. Valuable railroad property below was endangered, as well as highway traffic.

Maintenance engineers then prescribed a permanent "cure"—an ARMCO Bin-Type Retaining Wall that stabilized the slope for keeps. Now the highway has firm support and adjacent property is safe from encroachment.

Many engineers planning post-war work see ARMCO Walls as a practical safeguard against roadway slips, washouts, right-of-way headaches—in fact, wherever unstable earth threatens. Installation is easy and quick. One man can handle the strong yet light-weight metal units. These durable walls have the engineered strength and flexibility to overcome unequal settlement without cracking or bulging. A line of perforated corrugated pipe subdrain gives added assurance of stability.

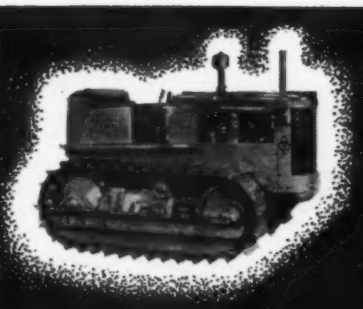
Get complete facts on these improved cellular walls before going ahead on your earth-retention problems and plans. Just write Armco Drainage Products Assn., 325 Curtis St., Middletown, Ohio.



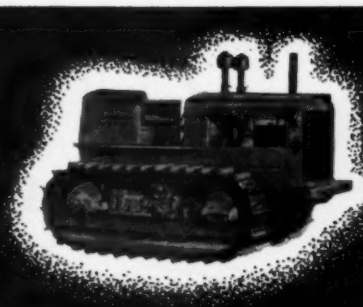
Engineers prescribed this ARMCO Wall to stabilize the slope. It assures firm support for the highway and safeguards valuable property below. The 150-foot wall, ranging from 6 to 12 feet in height, was easily installed by a local crew using ordinary small tools.

ARMCO

ARMCO BIN-TYPE RETAINING WALLS



HD-7's and HD-10's



MEAN ECONOMY ON MANY JOBS

Size up the job, then apply the right tractor power. In many cases smaller Diesels will handle the work as efficiently as larger models, at considerable savings.

Either the Allis-Chalmers HD-7 or HD-10 may be used for bulldozing, pulling graders, clearing or moving heavy machinery, depending on conditions . . . also with suitable 2- or 4-wheel scrapers or for pushing larger scrapers.

Use power to fit the job. Get your money's worth from your tractors. A well-balanced line of HD-7's, HD-10's and HD-14's is the answer to lower cost construction. Let your Allis-Chalmers dealer help you power your job *right!*

Here is economy. Work both ends of your HD-7.

Medium capacity 4-wheel scrapers are easily handled by the HD-10.

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Speed and Simplicity CUT HAULING COSTS

Rugged simplicity, always the basis of Euclid design, helps to keep hauling costs down because there is a minimum of wearing parts. Built to do one specific job... off-the-highway hauling of earth, ore, rock and coal... Rear-Dump and Bottom-Dump EUCLIDS cost less to own and operate.

With top speeds of 21.8 to 34.4 m.p.h.... carrying 15 to 30 ton payloads...Euclids move more yards or tons per day on both short and long hauls. For dependable, low-cost hauling on the toughest jobs... in mines, quarries, construction work and industrial material handling... rely on Euclid simplicity and hauling speed coupled with efficient digging and loading equipment.

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO

EUCLID SELF-POWERED HAULING EQUIPMENT
For EARTH ROCK COAL ORE

Evidence that Hubers are built to last is this recent photo of "old 2301". . . the first 4-cylinder automotive type road roller ever manufactured. Today's Hubers, still going to our fighting fronts, embody many refinements in design and construction, and yet possess all the ruggedness which has kept this "granddaddy of 'em all" on the job for the past 22 years. Take our word for it . . . you'll never regret waiting for *your* Huber!

THE HUBER MFG. COMPANY • MARION, OHIO, U. S. A.

HUBER ROLLERS

GAR WOOD TRUCK EQUIPMENT

FOR YOUR SPECIALIZED JOB

GAR WOOD INDUSTRIES, INC. GW TRADE MARK

Cam and Roller Hoist for long wheelbase chassis. High ground clearance for piling.

Direct-Lift Hoist. Body has trussed understructure, an exclusive feature.

Hydraulic and Mechanical Hoists, Dump Bodies, Winches, Cranes and Tanks, Including Flushers and Sprinklers for Trucks and Trailers

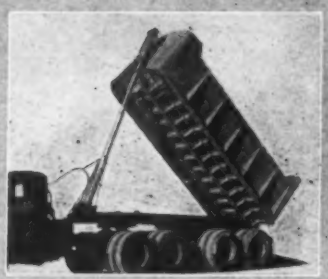
The units described on this page will give you an idea of the diversified line built by Gar Wood. Get your job done efficiently by selecting the equipment designed to fit your particular needs. Remember that Gar Wood is the world's largest manufacturer of truck and trailer equipment, and years of experience back up each unit. Be sure of dependable, top-notch performance . . . specify GAR WOOD.

Support the 7th War Loan Drive BUY MORE BONDS

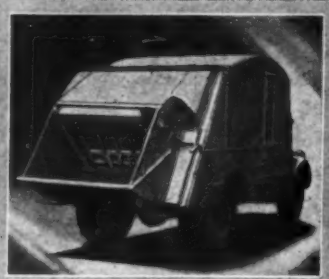
Typical installation for Six-wheelers.

Telescopic Hoist. Heavy-Duty Body.

Dual Telescopic Hoist and Rock Body. Down-folding gate.



Vertical Telescopic Hoist for long bodies.



Load-Packer. Compresses garbage and rubbish. Greater loads—fewer trucks and men required.

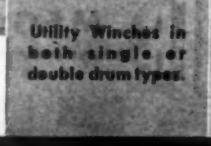
Tree-Moving Crane picks up, transports and re-sets trees.

Hydraulic Repair Tower.

Tanks for all types of liquids.

Street Flushers and Sprinklers.

Cranes. All types and sizes for handling pipes, machinery, etc.



Utility Winches in both single or double drum types.

Branches and Distributors in All Principal Cities

GAR WOOD INDUSTRIES, INC.

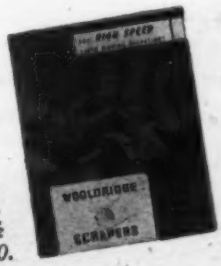
DETROIT 11, MICHIGAN

World's Largest Manufacturers of Truck and Trailer Equipment

HOISTS AND BODIES • WINCHES AND CRANES • TANKS • ROAD MACHINERY • HEATING EQUIPMENT • MOTOR BOATS

True directional steering of Wooldridge Terra Cobra, high-speed, self-propelled Earthmovers is unique in the field of two-wheeled units. At no time is one wheel required to pull the entire load, even on sharp turns or in soft earth. This results in less strain and wear on equipment and operators, insuring higher hourly averages throughout each daily shift. In a Wooldridge Terra-Cobra positive steering control is combined with positive two wheel power and speed at all times. Investigate fully. Get the full details.

WITH POWER MAINTAINED ON BOTH WHEELS AT ALL TIMES



WRITE TODAY *for twelve-page Bulletin No. TA-425.— And if you are also interested in Heavy-duty scrapers or other earth-moving equipment, ask for Bulletin No. W-210.*

WOOLDRIDGE MANUFACTURING CO.
SUNNYVALE • CALIFORNIA

WOOLDRIDGE
TERRA COBRA
SELF-PROPELLED EARTHMOVERS

THE TRUCK WITH THE BATTLEFRONT BACKGROUND

● One of the battlefront jobs of the Ward LaFrance Heavy Wrecker, M1A1, is to move in under the very nose of the enemy and remove damaged tanks and other vehicles to a repair base where they can be put in fighting condition again. The M1A1 has performed amazing feats, under the worst possible operating conditions, on all major fronts, where human life depends on *performance*.

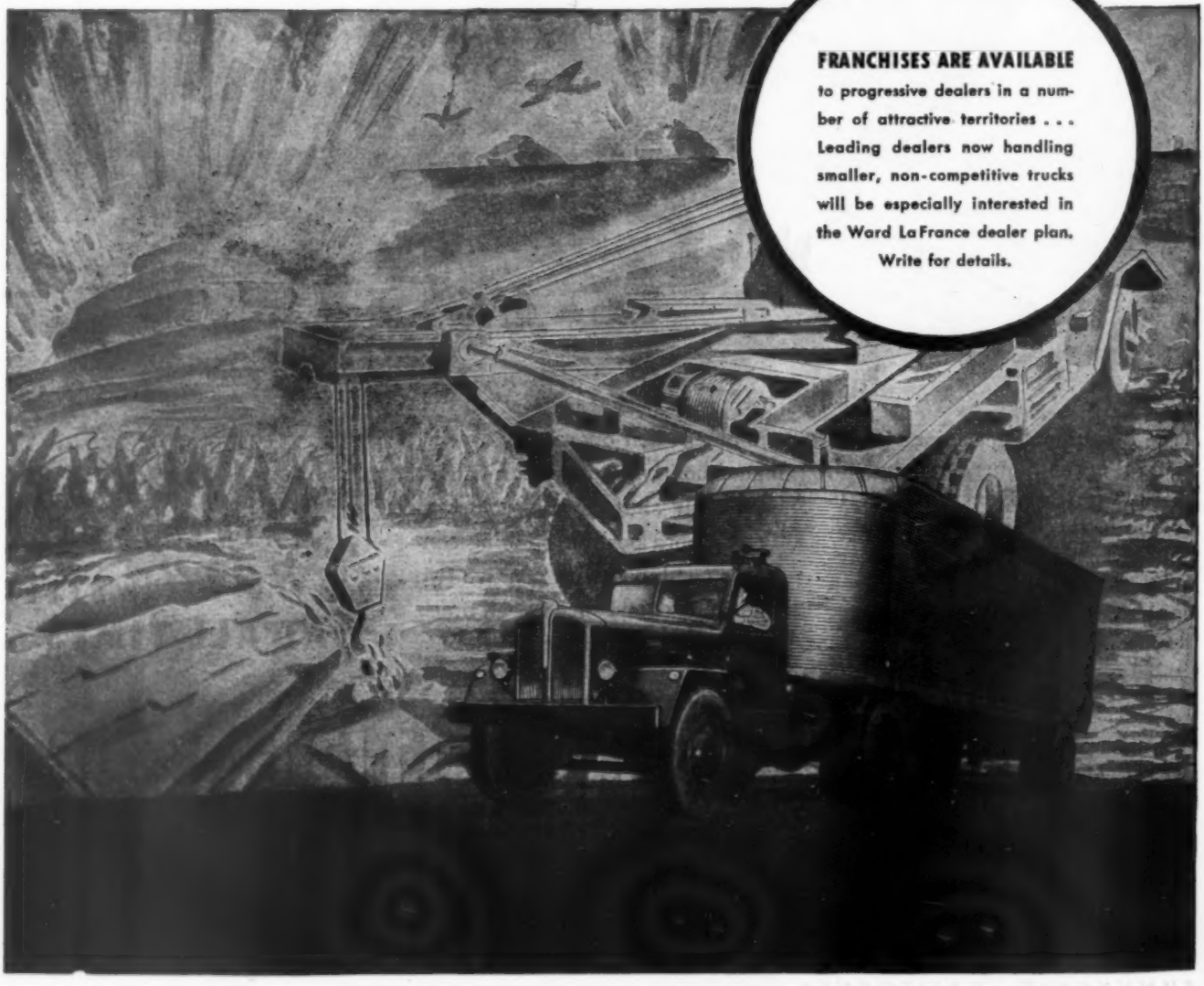
Building such good trucks is not new to Ward LaFrance, but our new commercial models, inspired by the outstanding record of this 6x6 Ordnance vehicle, are by far the best trucks we have ever manufactured. Like the M1A1 they are big and tough with pay load capacity ranging up to 30 tons. They're the trucks with the "battlefront background"... designed, engineered, and manufactured for low-cost hauling. Now available to essential users. See your local Ward LaFrance dealer. If there is no dealer in your locality, write direct.

GAI

WARD LAFRANCE

TRUCK DIVISION

GREAT AMERICAN INDUSTRIES, INC. • ELMIRA, NEW YORK



FRANCHISES ARE AVAILABLE to progressive dealers in a number of attractive territories . . . Leading dealers now handling smaller, non-competitive trucks will be especially interested in the Ward LaFrance dealer plan. Write for details.

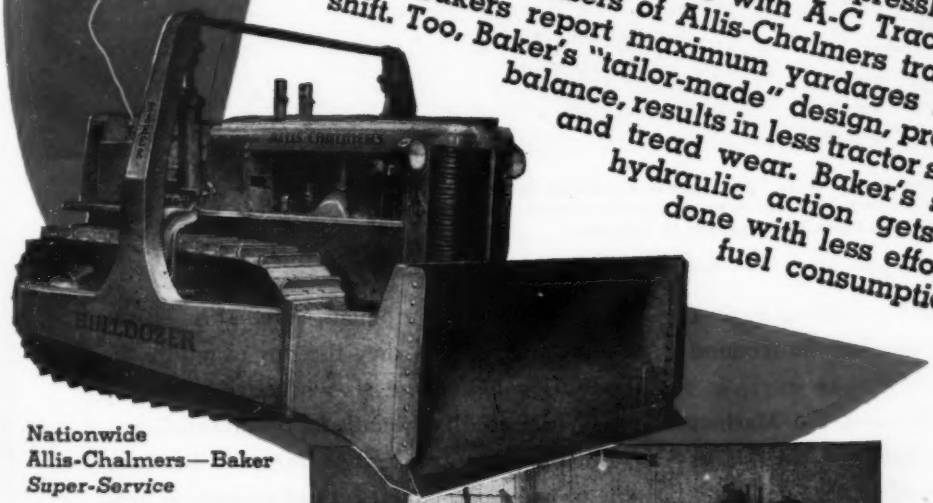
THEY LOOK GOOD TOGETHER
THEY WORK WELL TOGETHER

They Go Together!

Certain things go together like salt and pepper, balls and bats, peaches and cream. Baker Bulldozers or Grade-builders and Allis-Chalmers Tractors are in this category —*they go together!* Bakers look trim on A-C tractors; neither clumsy nor top-heavy. They fit like a glove—just as though they were designed and built by one company under one roof.

Baker and Allis-Chalmers engineers confer together on new equipment or design changes from the moment it goes on the drawing board through production. Other Baker tractor equipment—tampers, rippers, snow plows —as well as bulldozers, are *all* expressly designed from beginning to end for use with A-C Tractors.

No wonder users of Allis-Chalmers tractors equipped with Bakers report maximum yardages handled every shift. Too, Baker's "tailor-made" design, providing proper balance, results in less tractor sprocket, roller and tread wear. Baker's simple, direct hydraulic action gets more work done with less effort and lower fuel consumption.



Nationwide Allis-Chalmers—Baker *Super-Service*

In key cities everywhere, Allis-Chalmers — Baker dealers render a complete repair and maintenance service. Everything from a part replacement to a complete rebuild. Every A-C dealer is qualified to repair or install Baker bulldozers *and other tractor equipment.* They stand ready to help you.

BAKER

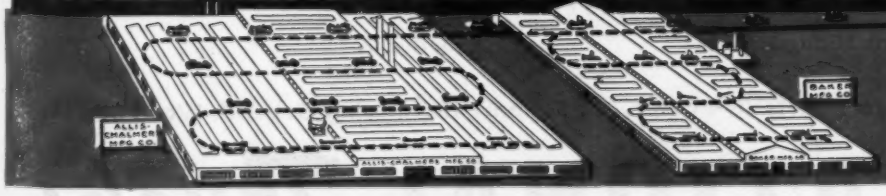
A-C

THE BAKER MFG. CO.

506 Stanford Ave. Springfield, Ill.

If it Concerns Victory, it concerns us!

"STRAIGHT THROUGH" ASSEMBLY LINE – ALLIS-CHALMERS TO BAKER TO YOU!



The modern Baker plant with its completely equipped fabricating, machining and blacksmithing shops adjoins the Allis-Chalmers crawler tractor plant. When you order an A-C tractor with Baker bulldozer or gradebuilder, your tractor leaves the A-C assembly line, crosses a narrow court and goes on the Baker final assembly line.

Fireworks ON WHEELS

Marine fireworks on bloody Iwo Jima, as pyramids of projectiles rain death on Japanese emplacements. Rocket launchers are mounted on International four-wheel-drive trucks. —Official U. S. Marine Corps Photo by S/Sgt. Rex M. Robbins.

AMERICA bounced back hard in this war against the Japs, and the boys who led the rebound were *United States Marines.*

From Guadalcanal to Okinawa the Marines have proved that boys from Kokomo, the Ozarks and the Bronx—when steeped in Marine Tradition, skilled with Marine training—are doggone good fighters. On beachhead after beachhead—then in jungle after jungle—they were far outnumbered by the Japs. But not outfought!

On they go, those Marines, on land and sea and in the air . . . outsmarting, outshooting, outkilling the enemy . . . till the Japs say "Uncle."

They have good equipment, sure. Most of the thousands of trucks they use, for example, are International four and six-wheel-drive military type vehicles built especially for the Marine Corps.

But proud as we are that Harvester has been able to make equipment rugged enough to fight with the Marines, we know that the real fighting machine in this march to Tokyo is the Marine himself. What a machine! All speeds forward . . . none reverse. Tough . . . rugged . . . smart. A superlative fighter. A superb citizen.

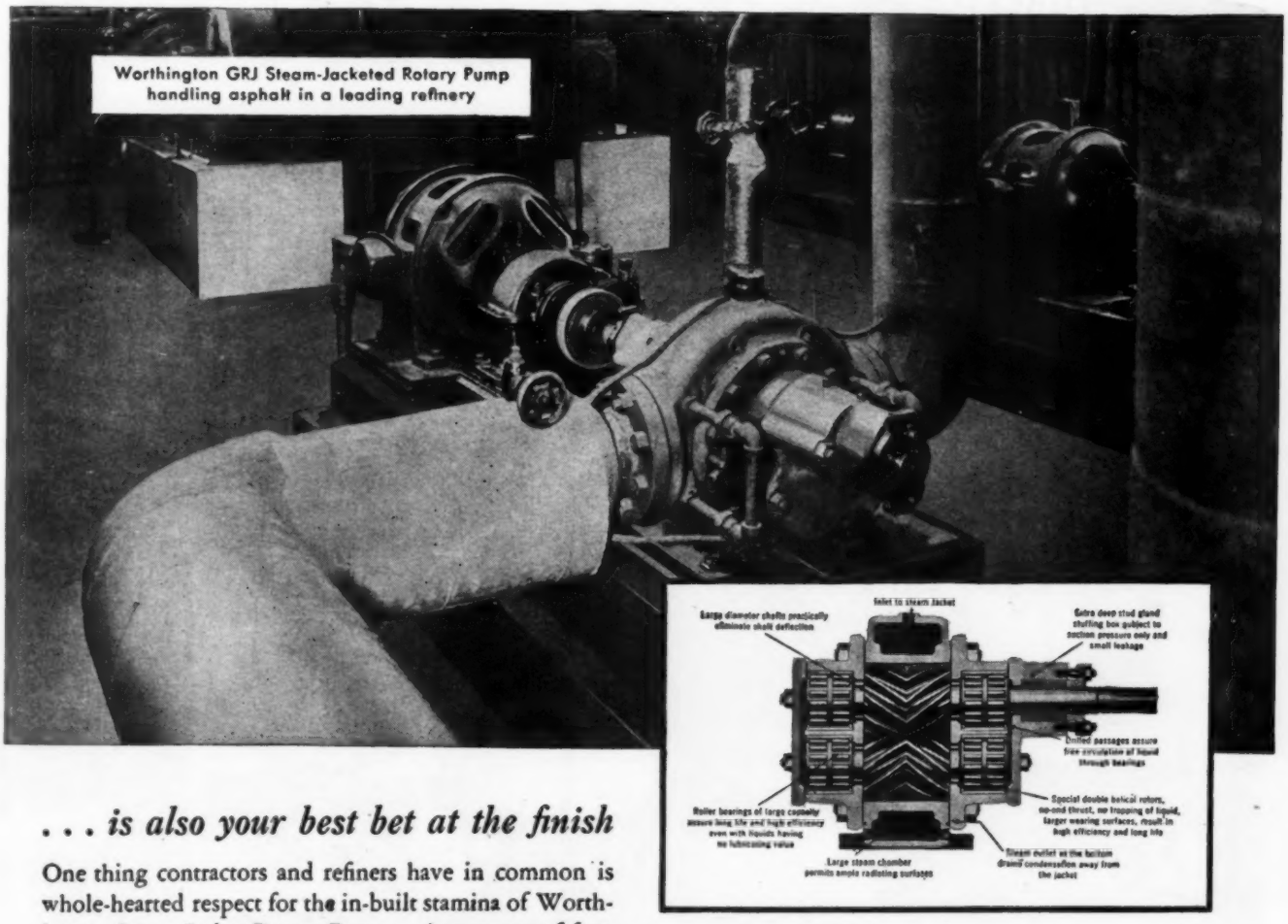
We proudly salute the boys from Kokomo, the Ozarks and the Bronx, who are *fighting* up to their glorious motto—Semper Fidelis.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

The War Bonds You HOLD Are FIGHTING BONDS . . . Support the Mighty Seventh War Loan

INTERNATIONAL *Trucks*

THE STEAM-JACKETED PUMP THAT GETS ASPHALT OFF TO A GOOD START



Large diameter shafts practically eliminate shaft deflection
Extra deep stud gland stuffing box subject to suction pressure only and small leakage
Drilled passages assure free circulation of liquid through bearings
Special double helical rotors, no-end thrust, no trapping of liquid, larger wearing surfaces, result in high efficiency and long life
Roller bearings of large capacity assure long life and high efficiency even with liquids having no lubricating value
Large steam chamber permits ample radiating surfaces
Steam outlet at the bottom drains condensation away from the jacket

. . . *is also your best bet at the finish*

One thing contractors and refiners have in common is whole-hearted respect for the in-built stamina of Worthington Steam-Jacket Rotary Pumps. As a matter of fact, many contractors don't even know that Worthington GRJ Rotary Pumps are installed right in their road oilers, pavers, and trucks. That's because these dependable asphalt handlers have a habit of staying out of trouble . . . so never call attention to themselves.

That's why you'll want to have these same trouble-dodgers keeping asphalt on the go from tank cars to storage tanks to tank trucks to the machines that apply it.

GET ALL THE FACTS

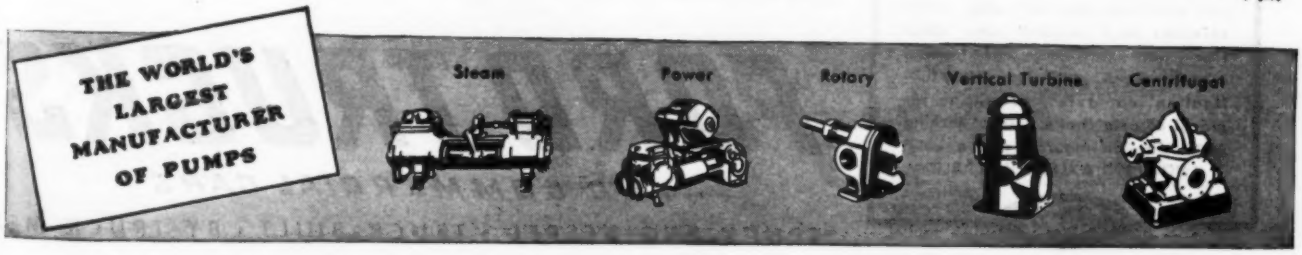
For vital facts a contractor should know about Steam-Jacketed Rotary Pumps for handling asphalt, write for Bulletin W487-B11. It proves that *there's more worth in Worthington. Worthington Pump and Machinery Corporation, Harrison, N. J.*

WHY WORTHINGTON GRJ ROTARIES CAN TAKE IT

1. **ROLLER BEARINGS** with more capacity than any other rotary pump.
2. **STUFFING BOX** much deeper than the average.
3. **SPECIAL DOUBLE HELICAL ROTORS** with larger wearing surfaces, free from end-thrust.
4. **HUSKY SHAFTS** mean trouble-free stuffing boxes.

WORTHINGTON

P 5-10



MORE FORD TRUCKS ON THE ROAD • ON MORE JOBS • FOR MORE GOOD REASONS

TRUCK-ENGINEERED FOR Easy Service

HOW FORD TRUCKS SAVE YOUR SERVICE DOLLARS

Check these owner-economies and advantages which Ford Truck Engineering provides:

Engine easy to service • Removable connecting rod bearings • Alloy valve seat inserts that reduce grinding frequency • Valve lifters that require no adjustment • Dual water pumps, self-lubricating and packless • Heavy-duty clutch and transmission, easy to remove • Self-aligning drive shaft bearing • Large hydraulic brakes, easily and positively adjusted • Large spindles and spindle pins • Heavy front axles • Large tapered wheel bearings • Heavy-duty full-floating rear axles, permitting removal of axle shafts without jacking • Straddle-mounted pinion • TWO-SPEED AXLES AVAILABLE.

Ford

FORD truck engineering has always had three main goals: better performance and endurance, lower cost and easy, thrifty servicing.

Certainly, Ford Trucks perform well. That's why there are more than a million Ford Truck owners! And the relatively low price of a Ford Truck commends it to every businessman who watches his dollars. As to servicing—

Read, at the left, the plain evidence of how Ford engineering saves your time and your money. And bear in mind that Ford high-precision manufacture, founded on accuracy standards measured in millionths of an inch, provides a better truck to begin with, and makes installation of new parts quick and easy, keeping costs down.

Today, truck servicing means more than ever before—and after the war the importance of Ford low maintenance costs will be still greater.

Under U. S. Government allocation, present production of Ford Trucks is necessarily limited, as to types, quantities and equipment, for essential civilian needs. See your near-by Ford Truck dealer for friendly counsel in obtaining official certification of your requirements.

• • •

"STARS OF THE FUTURE." *Brilliant singing stars, orchestra and chorus. Every Sunday, NBC network. 2:00 P.M., E.W.T.; 1:00 P.M., C.W.T.; 12:00 M., M.W.T.; 11:00 A.M., P.W.T.*

FORD TRUCKS

AND COMMERCIAL CARS

TRUCK-ENGINEERED • TRUCK-BUILT • BY TRUCK MEN

If you've had difficulty obtaining delivery of certain LaPlant-Choate models, please remember that dozers and scrapers continue to rate top priority as essential weapons of war. Moreover, again this year, LaPlant-Choate is producing more dozers for the armed forces than any other company in the industry.

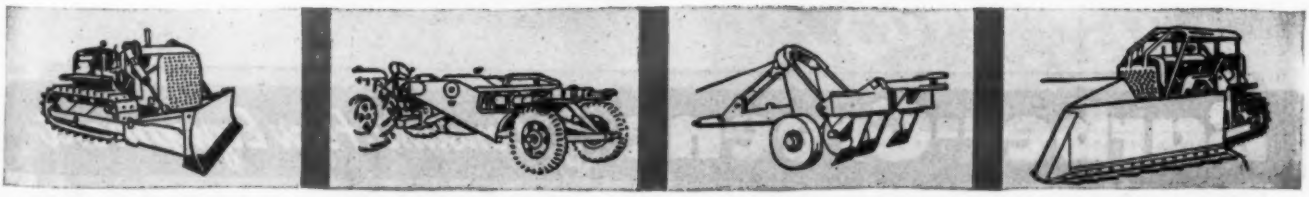
TRADE MARK

THIS MARK ON EQUIPMENT

means Lowest Possible Cost on the Job

Ask any of the thousands of satisfied owners who have used LaPlant-Choate equipment for years—and they'll tell you that you can't beat a LaPlant-Choate rig for saving time and money on the job. This LaPlant-Choate record of performance and economy—proved on tens of thousands of jobs the world over—will be even more evident in the new improved LPC earthmovers now being engineered for thrifty mass production after Victory. So before you buy any new earthmoving or land clearing equipment, be sure to look for the new LPC trademark. Backed by 34 years of *specialized* engineering and manufacturing "know-how", this new mark is your assurance of lowest possible cost per yard . . . per ton . . . per acre. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

LAPLANT CHOATE
EARTHMOVING AND LAND CLEARING EQUIPMENT

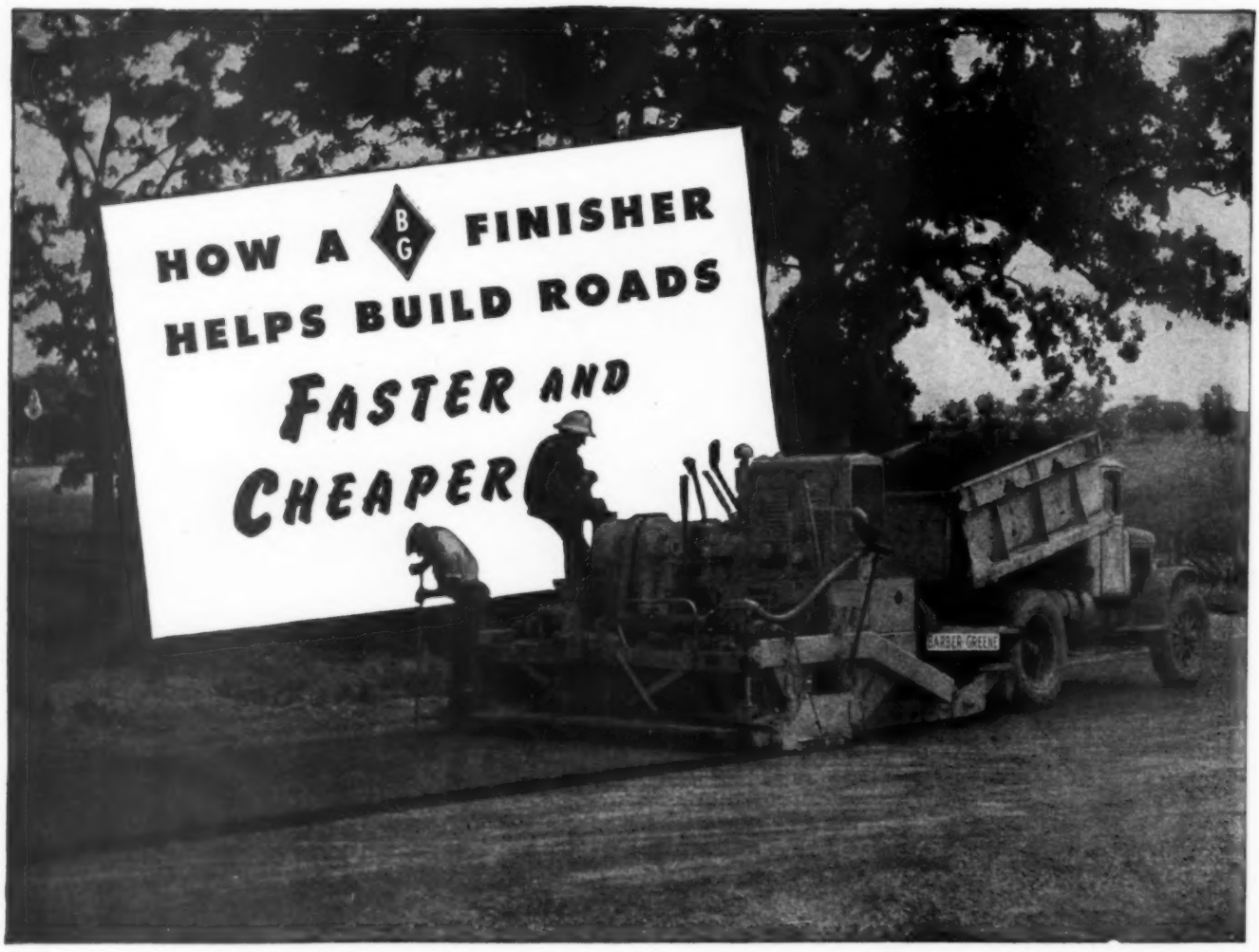


ALL TYPES OF DOZERS—Straight or angling blade, hydraulic or cable operated, for every size of track-type tractor.

LARGE OR SMALL SCRAPERS—Hydraulic or cable operated, front or rear dump, for use with your wheel or track-type tractors.

CABLE OPERATED RIPPERS—For ripping up hard ground, shale or concrete to facilitate loading with LPC "Carrimor" Scrapers.

LAND CLEARING TOOLS—A complete line of Brush Cutters, Treedozers, Rootcutters and Brush Rakes—all are interchangeable.

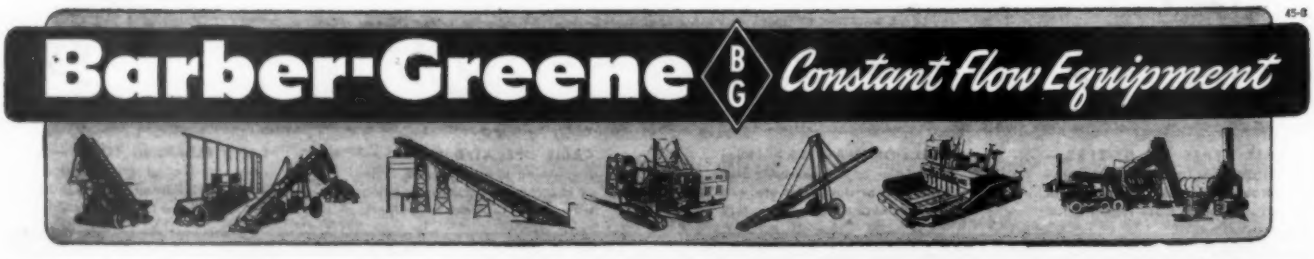


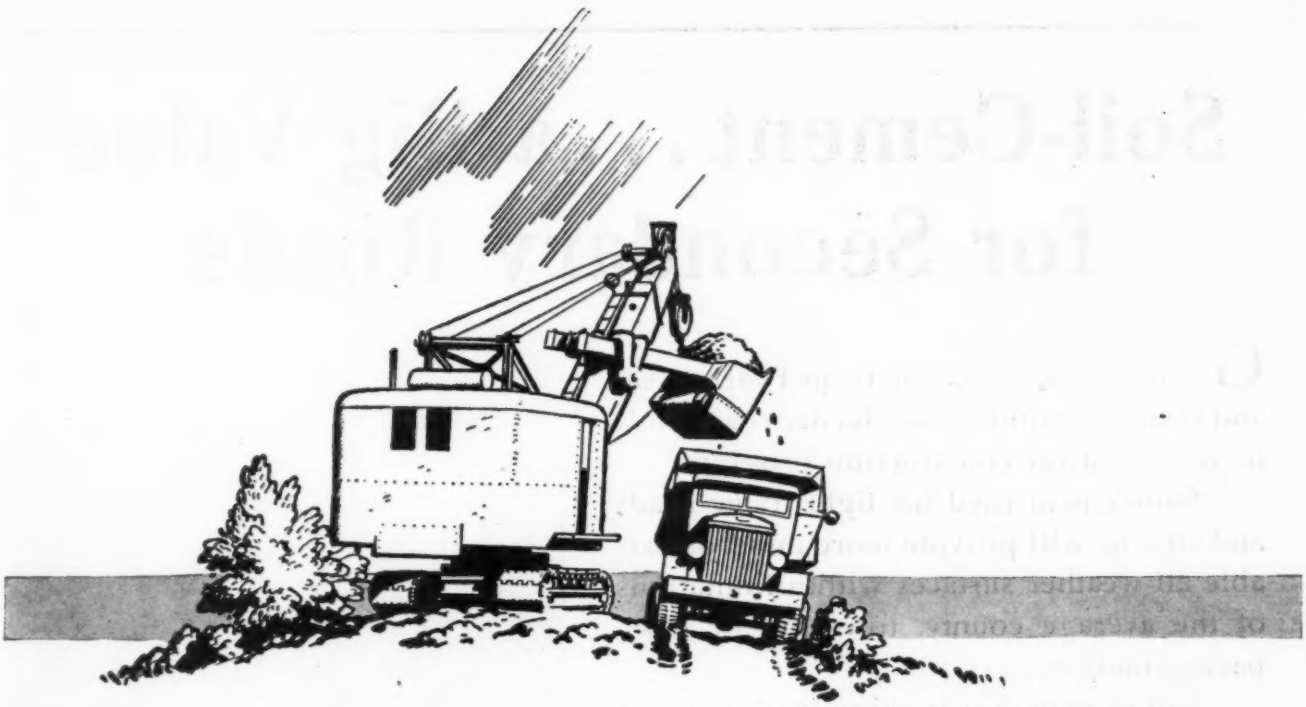
• Here's a machine that performs three jobs at once. And you can keep it moving steadily—all day long. In rapid succession, truckloads of asphalt mix are mechanically spread . . . "kneaded" and thoroughly *tamped* in place . . . and automatically leveled—all in one operation.

Moreover, the Barber-Greene Tamping-Leveling Finisher helps provide fast, cheap road construction by reducing the amount of rolling for adequate compaction . . . eliminating hand labor behind the machine . . . decreasing truck delay . . . cutting out the hazards encountered in other methods.

You'll find that a B-G Finisher saves days and dollars on every black top paving job. It handles mixes extremely difficult or impossible to lay by other means . . . maintains a mat of uniform thickness, ranging from ¼-inch to 6 inches . . . holds an accurate crown . . . and tightly seals joints with adjacent strips.

Before the call comes for the hurry-up resurfacing of worn-out highways, and the speedy construction of new roads and airports, plan to add a B-G *Tamping-Leveling* Finisher to your equipment. Write for literature outlining the functions and performance of this versatile machine. Barber-Greene Company, Aurora, Illinois.



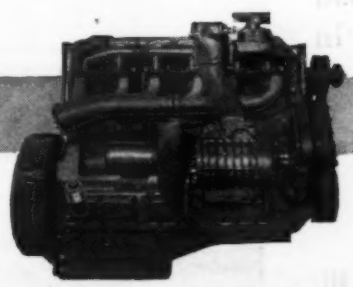


Of this... YOU CAN BE *SURE*

SURPLUS POWER IS PROTECTION . . . protection against the damaging shocks, jerks and strains that add to the abuse and shorten the life of powered earth moving and material handling equipment when there is barely "enough power" for *normal* requirements. *Surplus power* is protection, too, against lagging work cycles or accidents because reserve power is always available for peak loads or to meet any emergency.

For your wheel or crawler-mounted equipment or stationary applications, you can be sure of *surplus power* at the minimum cost in space and weight by standardizing on Cummins Dependable Diesels. Three compact, low-weight-per-horsepower models—150, 200 and 275 hp.—have almost the same mounting dimensions and may be used interchangeably in many cases. All have the same basic design and incorporate a large percentage of the same parts. This assures a simplified service procedure and reduces the parts inventory . . . important points in holding down costs and increasing profits.

Have you carefully considered these advantages in specifying Cummins Diesels for your equipment?



Illustrated is the supercharged, 275 hp. Model NHS Cummins Diesel. In design, dimensions and weight it closely approaches the 150 hp. Model H and the 200 hp. Model NH. All are designed for automotive, portable and stationary power applications. Ask for specifications.

CUMMINS Dependable DIESELS

SINCE 1918...PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS

CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

Soil-Cement . . . a Big Value for Secondary Roads

Get the utmost benefit from Federal Aid and county secondary and feeder road funds in your postwar construction program.

Soil-cement used for light traffic roads and streets, will provide more miles of durable all-weather surfaces within limitations of the average county, township or town paving budget.

Soil-cement construction is economical because about 90 per cent of required material is on the existing roadway. Old high maintenance cost gravel and stone roads can be rebuilt into strong, long-lasting pavements with soil-cement.

The superior value of soil-cement is demonstrated by its service record and by comparison with the cost and service of other types of road surfaces intended for similar traffic.

More than 39 million square yards of soil-cement paving in all parts of the United States is giving low annual cost service on light traffic roads, streets and airports.

Why not make soil-cement the basis of your secondary paving program? Send for "Specifications For Soil-Cement Road and Street Construction." Mailed free in United States and Canada.

May, 1945, picture of soil-cement road built in Winnebago County, Illinois, in 1936, shows road in excellent condition after nine winters and spring thaws.

Soil-cement road under construction by Winnebago County forces near Rockford, Illinois, in 1936.

PORTLAND CEMENT ASSOCIATION

Dept. A7-28, 33 W. Grand Ave., Chicago 10, Ill.

A national organization to improve and extend the uses of concrete . . . through scientific research and engineering field work

★ ***Buy and Keep More War Bonds*** ★

HERE'S WHY

HEIL CABLE SCRAPERS

unload faster and cleaner . . . with less cable pull

Heil Hi-Speed Bottom Dump Wagons help you establish speed and yardage records.

Heil "engine-mounted" Cable Dozers move more "pay dirt" speedily, dependably.

Heil engineers have done a thorough job of designing this big-capacity cable-scoop. You get speed, flexibility, and scientific weight distribution — to help you get bigger yardage at lower cost, along with a reputation as a successful operator.

Unloading clean and fast with less cable pull is only one of many features that give you maximum yardage per hour — maximum productive hours on the job. Write for bulletins describing famous Heil design features such as correct bowl design, scientifically located draft-pivot point, fulcrum-type lift, all-welded construction, etc., or —

See Your INTERNATIONAL TRACTRACTOR DISTRIBUTOR

ARMY E NAVY

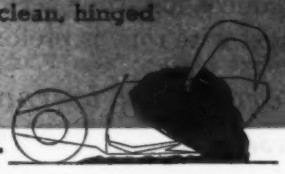
THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

R-49

...ting Floor Push-out

...out a third of the load rolls out by ...vity, through high-opening front ...on. Balance is ejected by moving ... tilting floor upward and forward. ...nged tilting floor scrapes ...es of bowl clean, hinged ...tion at rear ...apes back ...eet clean. ...t has no ...nce to stick.



Tilting is easier than pushing

It requires less power to raise and dump a load than to slide it forward against friction. Tilting also gives greatest leverage at the start of the unloading cycle, when load is heaviest — and a speed-up as the load is dumped, maintaining an even discharge.

Correct Bowl-Loading Action

Ordinary scrapers with a square-back bowl load with a void in the rear if operator stops digging when crown of dirt shows over top of bowl, resulting in less payload. Heil Scoops have the two features whichmakeforgood boiling action (1) correct pitch of cutting blade (2) correct shape of bowl.

Preformed wire rope

SAVES REPLACEMENT 3 WAYS

Since preformed wire rope lasts longer, obviously it reduces frequency of replacing the rope itself. Not quite so obvious, but equally important, is the ease with which preformed wire rope adjusts itself to different uses. Because of its ready adaptability—its resistance to rotating in sheave grooves and its better spooling qualities—preformed postpones the replacement of machine parts or shut-downs for repairing. A third way in which preformed wire rope saves replacement is with the men on the job. As preformed rope is safer to handle it reduces lost-time accidents. Make certain your next wire rope is preformed.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR DISTRIBUTOR

Some of the diversified "Caterpillar" Diesel equipment of the Dutcher Construction Corp. (Queenstown, Md.) working on airport, reservoir, army camp, and munitions plant projects.

His jobs are among the largest in the country. He can go anywhere. Tackle any size contract. And always beat or come close to his monthly yardage estimate . . . because—

He knows he has the right equipment. Knows what it can do. Knows that well-balanced variety enables him to *zone* his equipment for both long and short hauls—for shrewdly planned operation that means *lowest costs on earth*. He knows, too, that there's quick, sure, efficient mechanical and replacement-parts service always near at hand to keep all his machines in tip-top working condition.

In other words, the Dutcher Construction Corporation has reduced contracting guesswork and uncertainties to a minimum by STANDARDIZING on rugged, dependable, versatile and economical "Caterpillar" Diesel equipment all along the line. "In fact," writes Mr. Dutcher, "we have been 100% standardized on 'Caterpillar' equipment since before it was even known as such, prior to 1925."

"A great many of our jobs," continues Mr. Dutcher, "have run 24 hours a day, 7 days a week; and with the 'Caterpillar' equipment, there has been surprisingly little down time for repairs. In the few cases where we had to rent additional equipment of other makes, our operating cost records have shown that its upkeep greatly exceeded that of our own."

In dozens of big ways and hundreds of smaller ones, *it pays to* STANDARDIZE *on "Caterpillar" Diesel equipment.*

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

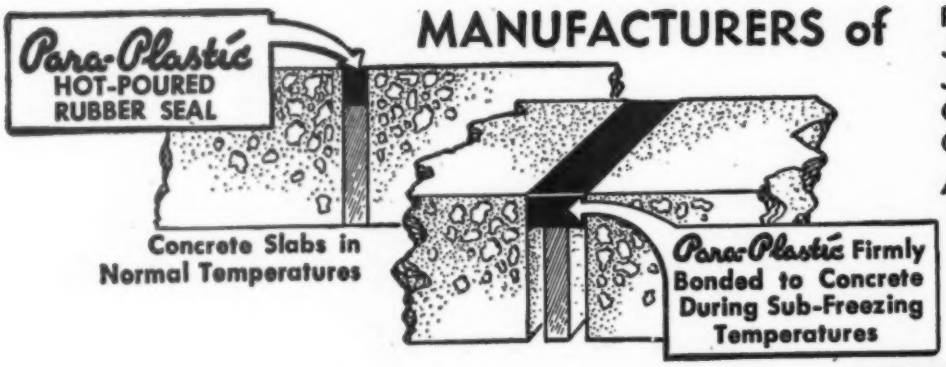
• The Dutcher Construction Corporation owns and operates 34 pieces of "Caterpillar" equipment — composed of D8 and D7 track-type Tractors, DW10 Wheel Tractors, Motor Graders, Elevating Graders, and Diesel Electric Sets. "Caterpillar" Diesel Engines also power the cranes they use.

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

The discharged veteran wears this emblem. Remember his service and honor him.



MANUFACTURERS of

PREMOULDED EXPANSION JOINTS; FELT-SIDED ASPHALT JOINTS; SELF-EXPANDING CORK JOINTS; FELT SIDED AND CORK JOINTS; FIBER JOINTS...

ASPHALT PLANK for—
INDUSTRIAL FLOORING;
BRIDGES AND BY-PASSES,
RAILROAD TRACK FILLER,
ETC.; ETC.; ETC.

— Para-Plastic —
EXPANSION JOINT SEAL
EXTENDABLE—MAINTAINS BOND at 0° F.

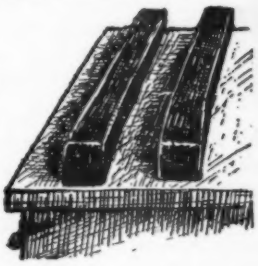
HIGHWAY DRIVING IS A REAL PLEASURE ON CONCRETE ROADS

MADE SAFE and SMOOTH with Para-Plastic EXPANSION JOINTS

1.

2.

3.



THREE TESTS: PROVING PLIABILITY OF Para-Plastic IN COLD WEATHER

SERVICISED QUALITY PRODUCTS © 1920

1 — PARA-PLASTIC Compound Frozen in Solid ICE.
2 — Still PLIABLE, easily BENT or TWISTED.
3 — In few Minutes—RESUMES Normal SHAPE.

SERVICISED PRODUCTS CORP.
6051 West 65th Street, Chicago, Ill.

RUGGED, DEPENDABLE PRIME MOVERS

for a Wide Range of Road Construction and Maintenance Jobs

The full power and pull of four driving wheels gives FWDs a wider range of usefulness and all-season service on all kinds and classes of highway construction and maintenance.

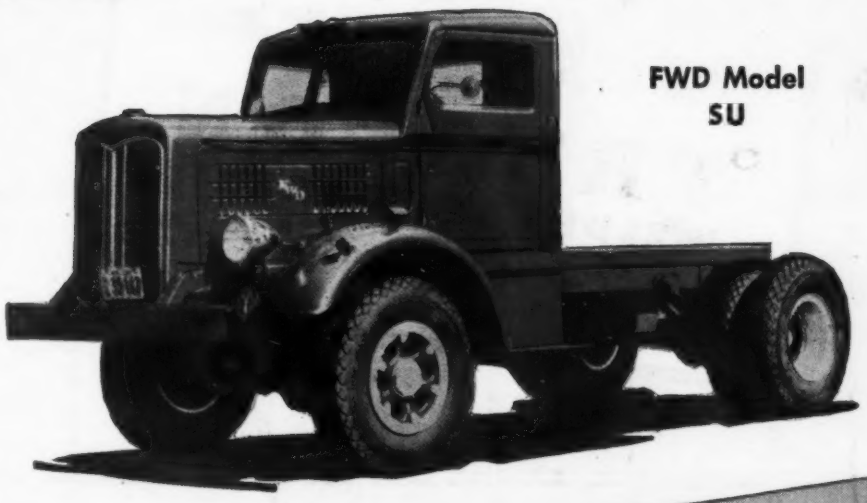
Blading and maintaining . . . hauling material and equipment . . . pulling graders or other heavy units . . clearing snow . . . crash service or other specialized, emergency duties . . . these are but a few of scores of road jobs that can be done better—faster—at less cost with FWDs.

The ample reserve power, the rugged construction, the equalized power and load distribution provided by FWD's true application of the four-wheel-drive principle with the basically important center differential, qualifies FWDs for all season, all-year, all-purpose service in highway operations.

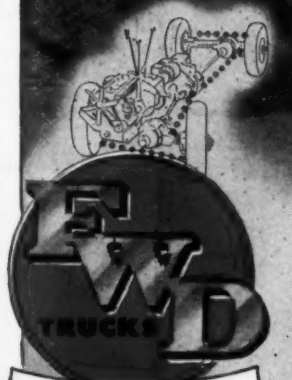
Write for complete information.

THE FOUR WHEEL DRIVE AUTO CO., Clintonville, Wisconsin

Canadian Factory: KITCHENER, ONTARIO



FWD Model SU



THE ORIGINAL EXCLUSIVE BUILDERS OF FOUR-WHEEL-DRIVE TRUCKS

TRUSCON WELDED STEEL FABRIC

for long-lasting, economical highways!

Truscon Welded Steel Fabric is a permanently bonded mesh of tremendously strong wire, that imparts great strength and long life to concrete. It assures:

Resistance to cracking during setting period.
Tensile strength against subgrade friction.
Resistance to cracking due to warping.
Resistance to development and opening of cracks.
Resistance to slab separation.
Decrease of spalling and disintegration.

Ask experienced Truscon highway engineers to help you design and build better roads for communities you serve.

TRUSCON STEEL COMPANY • Youngstown 1, Ohio
Subsidiary of Republic Steel Corporation

TRUSCON
WELDED STEEL FABRIC
• *Covers the Continent* •

UNIT 514

5 TON CRANE

Speeds up Material Handling!

For speed, flexibility and unequalled performance, you just can't beat this UNIT 514. Ultra-modern in design, it has plenty of brawn and power to take hard, everyday punishment. Equipped with famous UNIT one-piece cast case to provide perfect alignment of all working parts. Low initial cost and low upkeep assures maximum economy over a long period of years. It will pay you to investigate.

Write for literature.

FULL VISION CAB

New, Full Vision Cab provides maximum visibility. Operator can see in ALL directions. Promotes safety. Increases efficiency.

½ YD. CLAMSHELL

½ YD. DRAGLINE

½ YD. SHOVEL

½ YD. TRENCHOE

CONVERTIBLE to All Attachments

Shovel . . . Clamshell . . . Dragline . . . Trenchoe . . . Magnet . . . Pile Driver . . . Back Filler.

UNIT CRANE & SHOVEL CORP. UNIT MILWAUKEE WISCONSIN

UNIT CRANE & SHOVEL CORP., Milwaukee 14, Wis., U.S.A.

A 4815-1P-C

Hard-Faced FOR A TOUGH JOB

SPREADING 125-TONS OF HOT ASPHALT MIX EACH HOUR abrazed the surface of this screw conveyor below the precision road building standard in 15 days. Chafing action was minimized and work-hour life extended to 40 days when the owners, Sparks & Mundo, Los Angeles paving contractors, electrically deposited 50 pounds of MIR-O-COL No. 2 hard-facing metal over the plane and edge of the worm in 6 hours. Three-way savings—of maintenance time—of work-hours—of conveyor life—prove hard-facing with MIR-O-COL metals to be practical and inexpensive. This metal can make your equipment last longer. Write today for the name of your nearest distributor.

Manufactured by

MIR-O-COL
HARD-FACING RODS
ALLOY COMPANY
2416-60 EAST 53RD STREET, LOS ANGELES 11, CALIFORNIA

TO SECURE YOUR FREE COPY of the "Weldor's Guide to Successful Hard-Facing," write to MIR-O-COL ALLOY Company. Give your home address if you wish to be put on the MIR-O-COL News monthly mailing list.

FREE

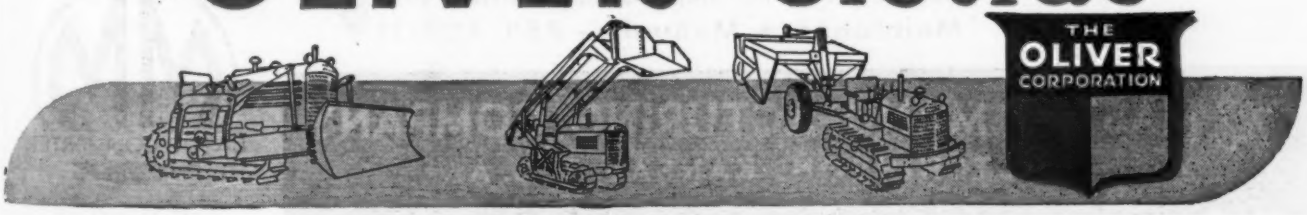
• Combine the sure-footed power of an Oliver "Cletrac" crawler tractor with the versatility of a Sargent overhead shovel and you get a one man construction crew that really speeds job progress.

You get maximum traction to crowd backwards into the pile and get a full dipper every time . . . to speed forward and discharge fast . . . even in the muddiest going.

This "one man gang" speeds loading out trucks . . . stripping loam or overburden . . . handling snow removal . . . digging foundations . . . tearing up and loading out old cobblestone or black top street surfaces . . . or on any job that calls for a speedy, powerful tractor shovel. And in a very few minutes a cable operated bulldozer or angledozer can be attached for grading or spreading operations. It's an all purpose unit . . . tractor, loader, angledozer, or tractor shovel.

For complete information on the "one man gang" that can help step up the pace of your jobs, see your Oliver "Cletrac" dealer. Substantial numbers are now being released for essential use. Your dealer will gladly assist you in making application. **The OLIVER Corporation,** 19300 Euclid Avenue, Cleveland, Ohio.

OLIVER - Cletrac

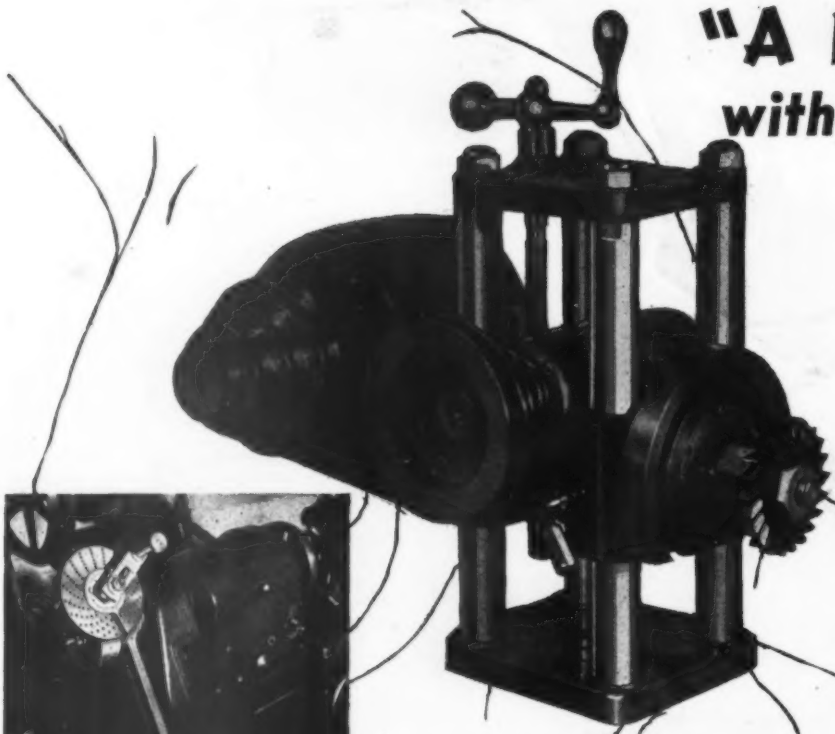


"A NEW HAND" with Nimble Fingers

FOR MAINTENANCE

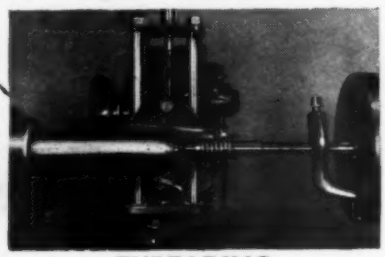
AND

PRODUCTION MEN



KEY SEATING

DIVIDING HEAD



THREADING

MILLING

GRINDING

THE MASTER LATHE CONVERTER

VERSATILE . ACCURATE . FAST!

Maintenance and production men are constantly called upon to repair a broken part or make a new tool. Speed is imperative. Shut-downs and production delays are costly. More often than not the needed part or tool requires a great many different machine operations, more delays. Pulling single purpose machines out of regular production and setting them up for special operations adds more cost.

The answer is: the Master Lathe Converter — it's portable, compact, simple, and accurate. The interchangeable heads can be quickly adjusted to perform almost any metal operation. For versatility, accuracy, and speed, equip with a Master Lathe Converter!

Catalog No. 10 includes Operating and Maintenance Manual — ASK FOR IT

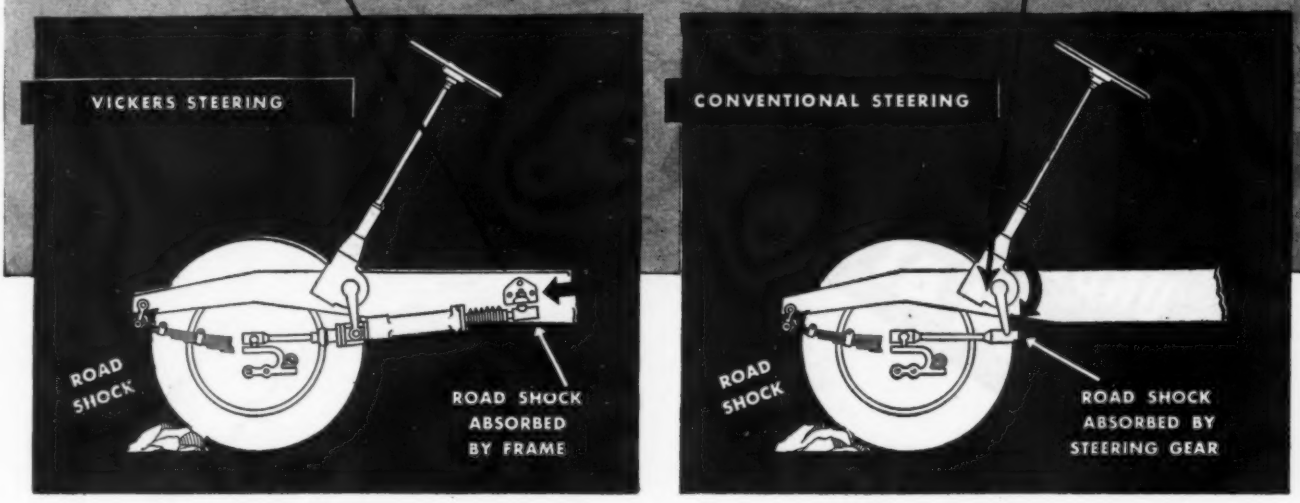
the MASTER MANUFACTURING COMPANY
HUTCHINSON, KANSAS, U. S. A.

MM
LATHE CONVERTER

ADDRESS DEPT. RS

VICKERS Hydraulic POWER STEERING

Transmits Road Shock Thrusts to the *FRAME... instead of to the Steering Gear*



With Vickers Hydraulic Power Steering, no road shock can be transmitted to the steering gear and to the driver . . . road shock thrusts are transmitted to the frame. A vehicle can be driven over the curb, through sand, and on rough ground with no "fight" from the wheel. A flat tire will not cause swerving. A light touch on the steering wheel is sufficient at all times.

Among the many other important advantages of Vickers Hydraulic Power Steering are: greater driver efficiency by reducing fatigue to a minimum, easy application to existing chassis designs, automatic overload protection for both hydraulic system and steering linkage, and 15 years of successful operating experience on trucks, buses, road machinery, etc. Ask for Bulletin 44-30 which contains complete information about the Vickers Hydraulic Power Steering System.

VICKERS *Incorporated* **1432 OAKMAN BLVD. • DETROIT 32, MICH.**

Application Engineering Offices: CHICAGO • CINCINNATI • CLEVELAND • DETROIT • LOS ANGELES • NEWARK
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VICKERS Hydraulic POWER STEERING is Simple . . . Compact . . . Easily Installed

THIS VITAL POST-WAR JOB MEANS JOBS IN YOUR COMMUNITY!

THE Federal Government has already appropriated 1½ billion dollars to construct postwar highways, roads and streets. To participate in the benefits of this national program, each state or municipality must be prepared with its matching funds—and their plans should be in the "ready-for-action" stage now!

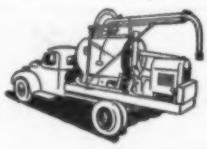
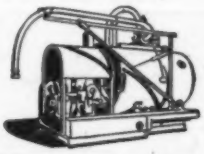
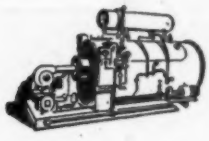
This plan sponsored by the American Road Builders Association deserves enthusiastic support. It will mean millions of jobs for returning veterans, not only in the construction industry but in durable and consumer goods industries as well. It will directly benefit every American by providing needed modern highways and streets.

This sound, practical plan for peacetime jobs in your community demands your active interest and support. If you have not already done so write the American Road Builders Association, 1319 F Street N. W., Washington 4, D. C. for a free copy of "The Road Ahead," explaining the plan in detail.

CLEAVER-BROOKS COMPANY, 5106 N. 33rd Street, Milwaukee 9, Wisconsin

Cleaver-Brooks

TANK CAR HEATERS . . . BITUMINOUS BOOSTERS . . . AUTOMATIC STEAM PLANTS

SNOW STORMS *Won't Wait* FOR EQUIPMENT *That's Late!*

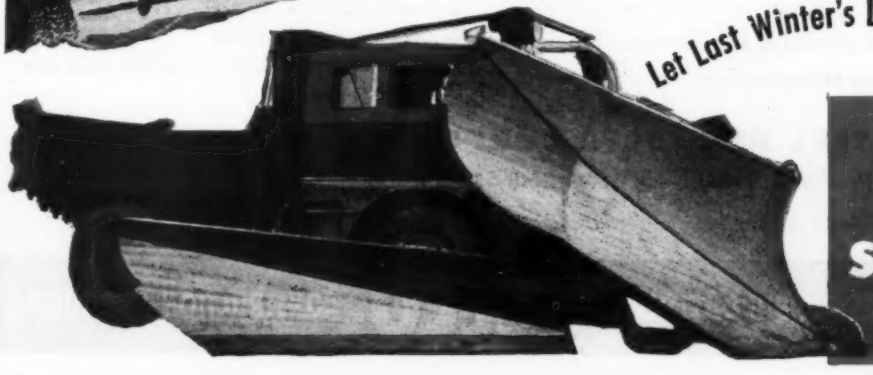
Snow is no respecter of delivery dates. It may strike while you're waiting for equipment ordered "too late." Play it safe. Get your orders in early and be ready for the first blizzard.

Send today for details on Walter Snow Fighters—the fastest method of snow removal. Study their engineering, their construction details, their record in other highway departments. Work with Walter snow removal experts in planning your program. A headstart now means fewer headaches next winter!

HOW WALTER 250 H.P. SNOW FIGHTERS BEAT BLIZZARDS TO THE PUNCH!

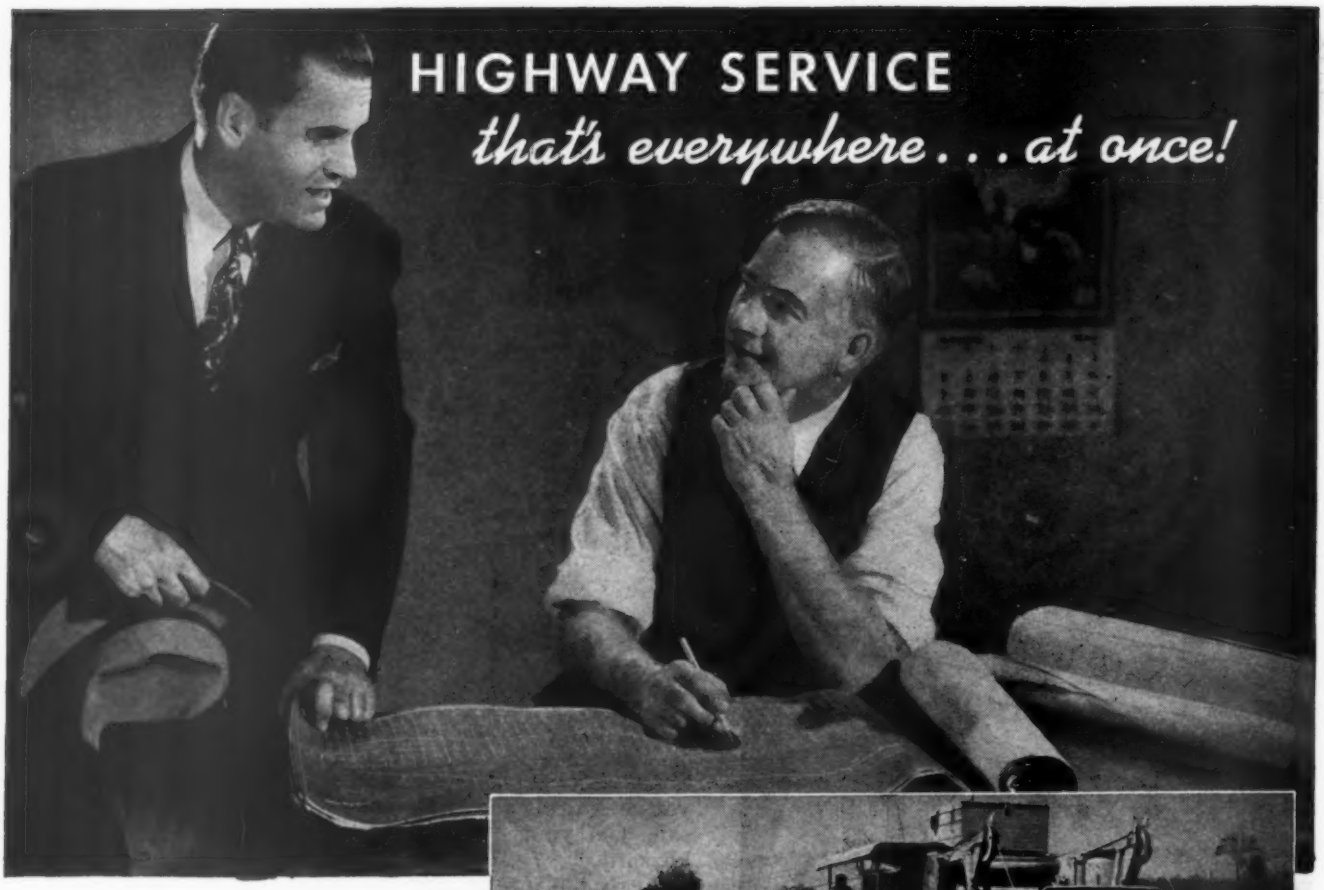
- Clear a 28 ft. width in one run—have rugged power to smash through road-blocking drifts, plus speed to clear more miles per hour.
- Throw snow far to the side—makes widening-out easier.
- Power is not wasted in slipping, stalling or wheel-spinning because the exclusive Walter 4-Point Positive Drive delivers power to FOUR driving wheels according to their traction at any instant.
- By clearing main highways faster, you gain extra time for opening more miles of secondary roads.

WALTER MOTOR TRUCK CO., 1001-19 Irving Ave., Ridgewood 27, Queens, L. I., N. Y.

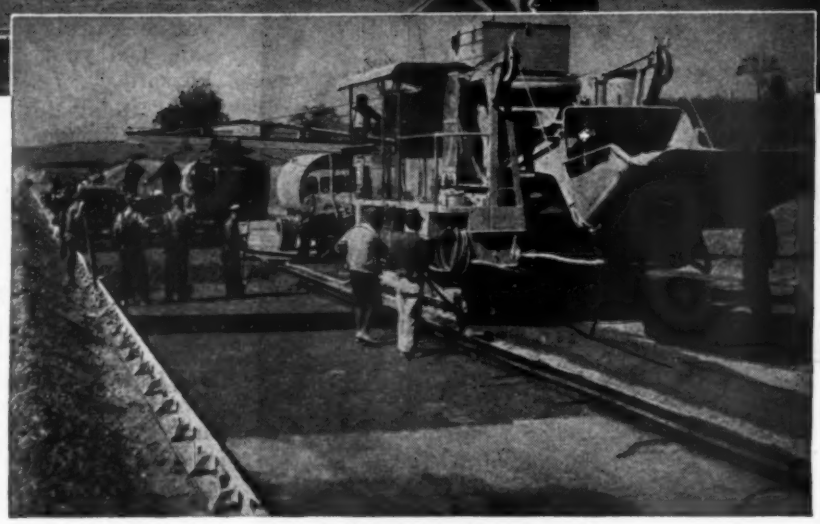


Let Last Winter's Lesson be Next Winter's Warning!

Order WALTER SNOW FIGHTERS Now!



"YES SIR . . . 22 CECO OFFICES strategically located give speedy service to road builders everywhere!"



Nation wide service from 22 offices. That's only one advantage of the Ceco Highway Products Division service to road builders. Here's another . . . by specifying Ceco you can take care of your Highway product needs in one order, for Ceco provides a complete speedy service.

And remember, Ceco is the country's largest independent fabricator of bars . . . and that means experience in steel fabrication. Yes sir, when you specify Ceco you can be certain you're getting what it takes to do a better job, faster! Be sure to check the list of Ceco Highway Division products, then write for details. Do it now, well in advance of your post war construction!

Here ROADBUILDERS, is your Check List of CECO Highway Products . . .

1. Reinforcing steel
2. Welded fabric
3. Expansion and contraction joint: asphalt or fibre
4. Metal centerstrips
5. Load transmission devices
6. Cecure curing compound
7. Dowel bar supports, dowel sockets, stake pins
8. Subgrade paper

CECO STEEL PRODUCTS CORPORATION

Highway Products Division—5701 W. 26th St., Chicago, Ill.

Manufacturing Division, Concrete Engineering Division, Sheet Steel and Wire Division

ENGINEERING MAKES THE BIG DIFFERENCE IN CECO CONSTRUCTION PRODUCTS

Horse sense about Horsepower

Common, ordinary horse sense tells us that worn cylinders mean lost horsepower . . . and horsepower costs money.

To cut down this waste and keep engines up to top efficiency, we need something that will stand up to the beating that cylinder walls get. At least, that's what Hendrik van der Horst figured . . . and several years ago he discovered a cylinder wall surface that multiplies cylinder life 4 to 20 times.

Van der Horst discovered a method of bonding a thick layer of chromium to the cast iron of the cylinder bore and then giving it a "porosity treatment". Everybody knows that chromium resists corrosion and that it is almost as hard as diamonds. But the unusual feature of Van der Horst's PORUS-KROME is the porous nature of its surface.

PORUS-KROME has thousands of tiny pores or channels in its surface . . . so tiny you can't see them with the naked eye. They act as reservoirs, holding lubricating oil and feeding it back to the surface as needed. Not only does PORUS-KROME make cylinder walls last longer, but it also multiplies the life of the conventional rings 3 to 5 times.

These are the reasons so many Army and Navy engines have PORUS-KROME in their cylinders. And it's just good horse sense to plan to have it in your engines, too. Write for booklet telling all about PORUS-KROME.

Van der Horst Corporation of America, Olean, New York. *Plants in Olean, New York and Cleveland, Ohio.*

PORUS - KROME

VAN DER HORST

the Job—

To pour 100,000 cu. yd. of concrete at a profit!

JOBS like this—paving airport runways and highways where hundreds of thousands of cu. yd. of concrete are required—will be open for bids when the postwar construction program gets under way. You can get your share of them and make a profit if you have MultiFoote pavers that mix and pour better concrete faster at lower cost.

Double cone drum with its end-to-end scouring action insures a complete and thorough mix of every batch. Trouble-free water system is simple, accurate and independent of water pressure. High operating platform assures greater visibility and faster, more accurate work. Rotary discharge takes only a quarter turn to dump concrete into the big bucket ready to speed out the long boom and discharge. Big, wide, solid skip prevents spilling and provides fast, positive charging. Superior engineering and construction assure long, trouble-free operation with the minimum of maintenance. All these features mean that you can make more money on big jobs as well as smaller ones with MultiFoote pavers. See your local Foote dealer for details.

THE FOOTE COMPANY
1936 State Street Nunda, N. Y.

Equipment

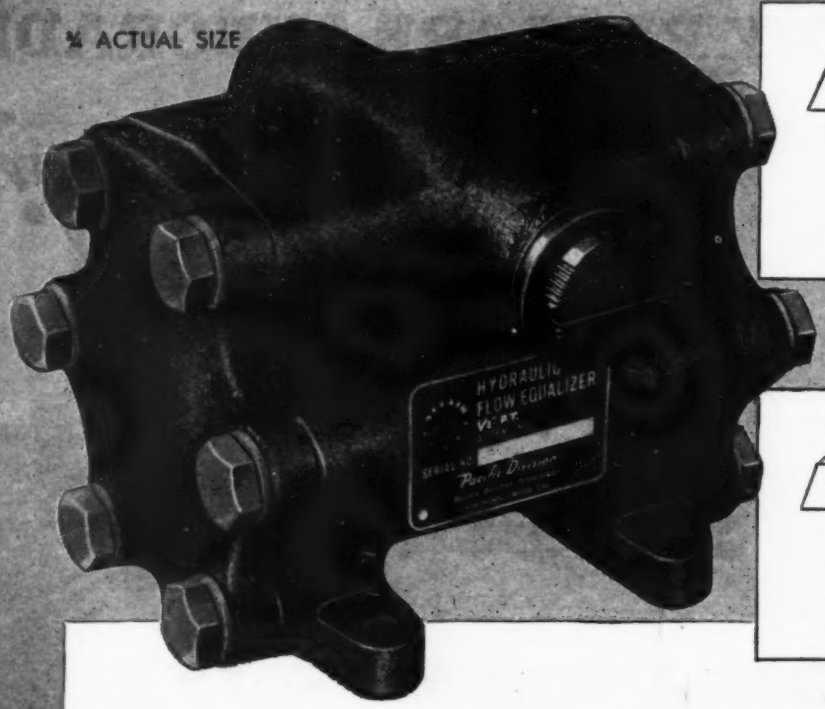
High Capacity 34 E. MultiFoote Pavers

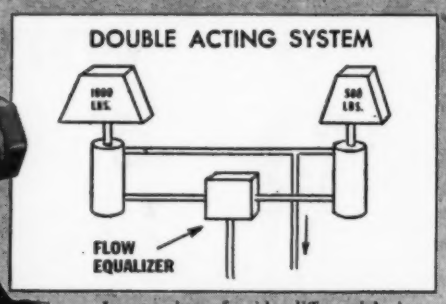
MULTIFOOTE

CONCRETE PAVERS

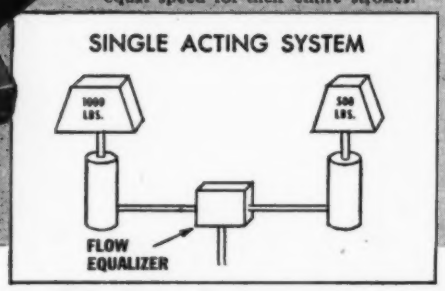
ARMY (E) NAVY

ADNUN BLACKTOP PAVER





Irrespective of wide differentials in loads or restriction the Bendix Equalizer synchronizes action in *both* directions. Although the ram at left is doing twice the work—both rams travel at equal speed for their entire strokes.



EQUAL RAM SPEED, REGARDLESS OF LOAD WITH THE BENDIX FLOW EQUALIZER

Now... you can equalize the speed of two unevenly loaded hydraulic rams, in both directions—raising or lowering—with the Bendix Flow Equalizer. All outside adjustments have been eliminated... the metering is automatic and foolproof.

The Bendix Hydraulic Flow Equalizer eliminates the necessity for mechanical interconnection or for two pumps. The installation is simple and inexpensive... merely replace the "T" in the pressure line from the control valve with the Equalizer to accomplish full synchronization of the hydraulic rams.

A special proportioner version of the unit is available which will split the flow into two lines with proportional flows greater in one line than the other. Operated in the reverse direction it will *combine* two such uneven flows, constantly maintaining the specified proportion between the two lines.

The Equalizer shown is the ½" P. T. size and will handle flows of from 2 GPM to 8 GPM. Wire or write for Bulletin BA-100 containing complete installation and performance data. Our engineering department is available to confidentially assist you on any hydraulic problem.

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Pacific Division
Bendix Aviation Corporation
NORTH HOLLYWOOD 7, CALIF.
LINCOLN BLDG. NEW YORK 17
CONTINENTAL BLDG. ST. LOUIS 6

• MANUFACTURERS OF A COMPLETE LINE OF HYDRAULIC EQUIPMENT FOR INDUSTRY •

ELIMINATE the expensive time and labor consuming hand raking and shoveling always necessary when the subgrade is prepared by ordinary methods.

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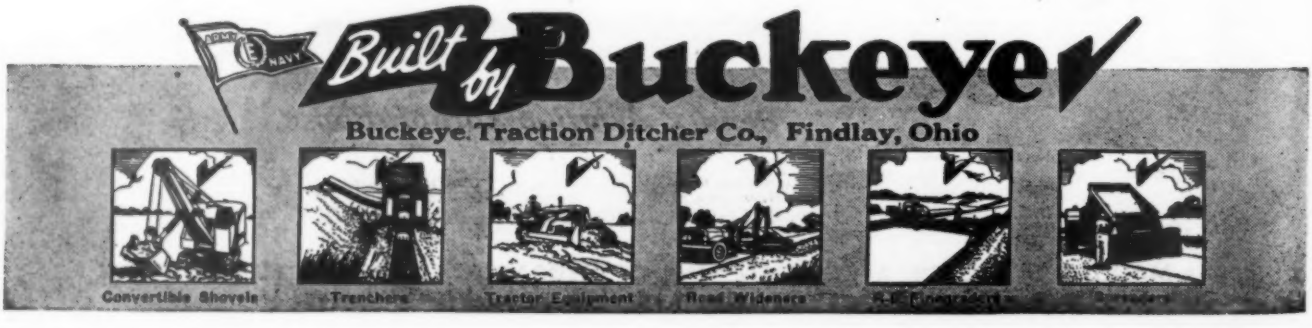

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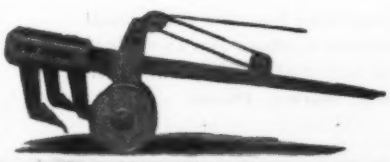

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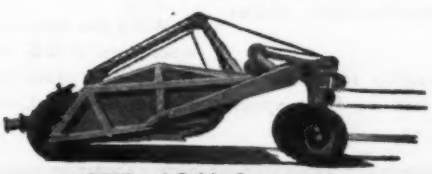

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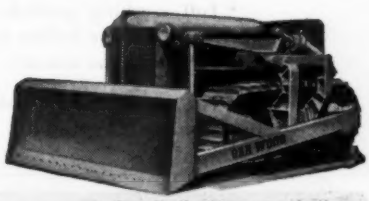

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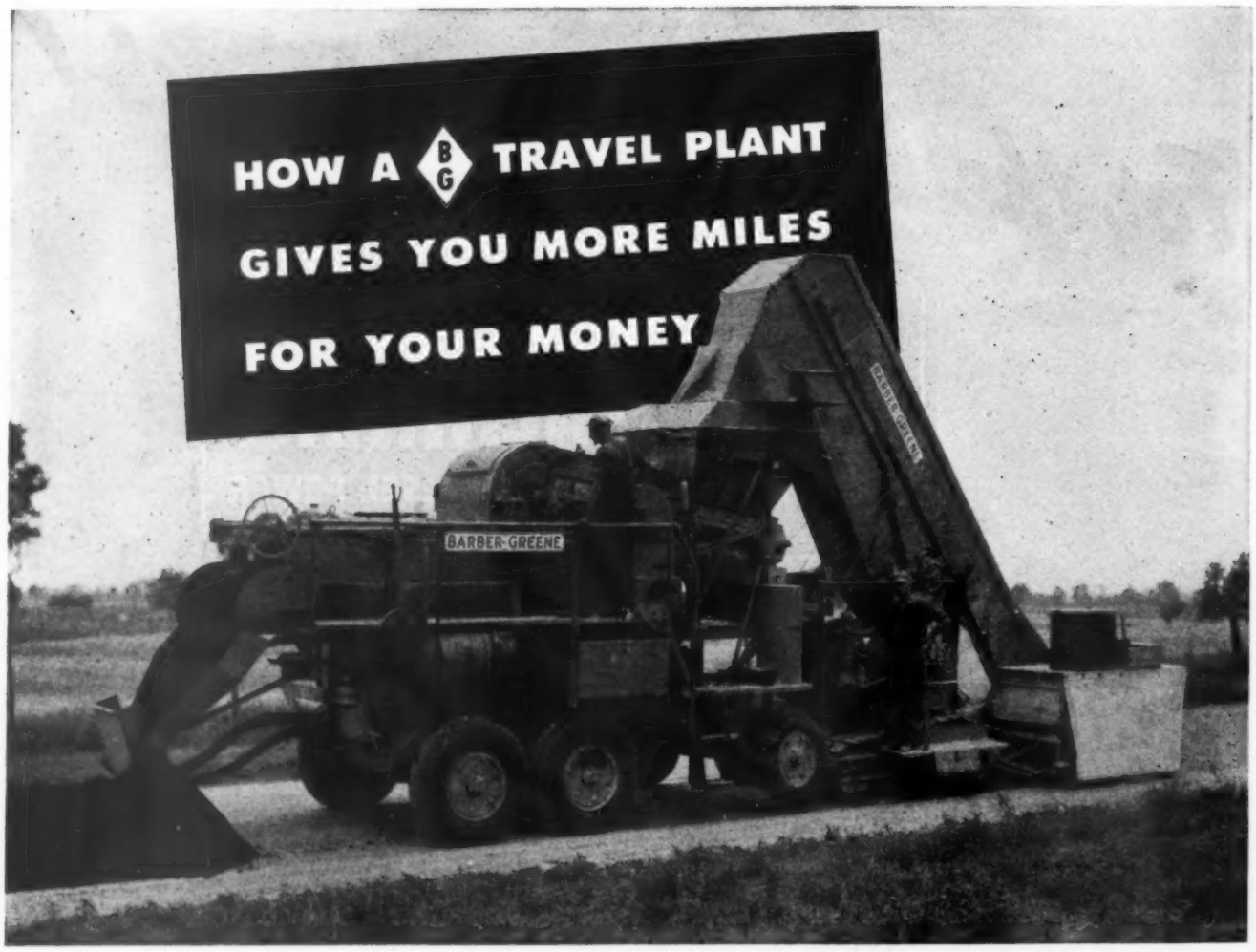

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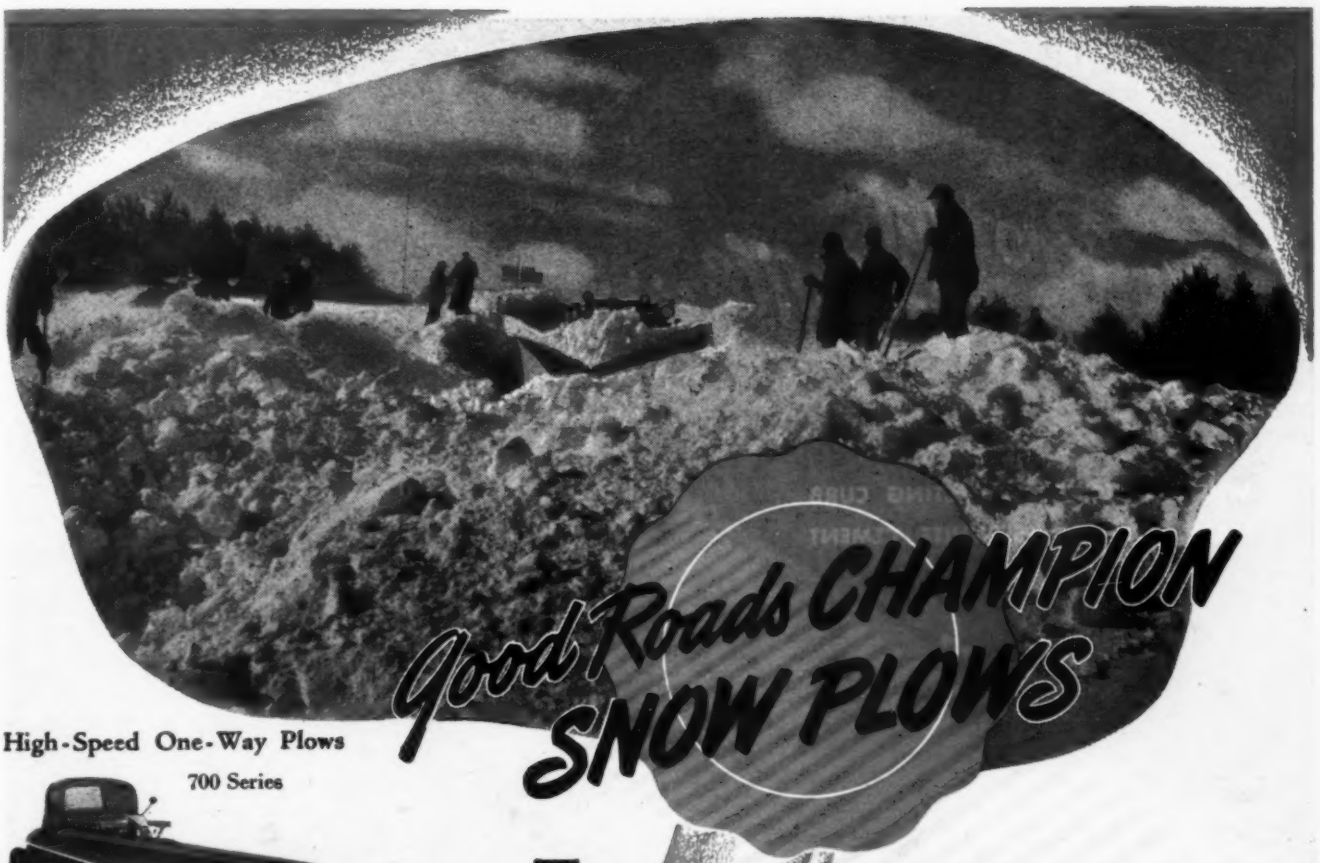

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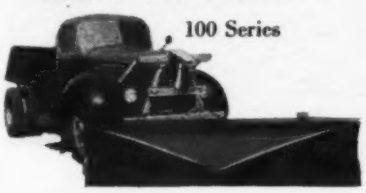

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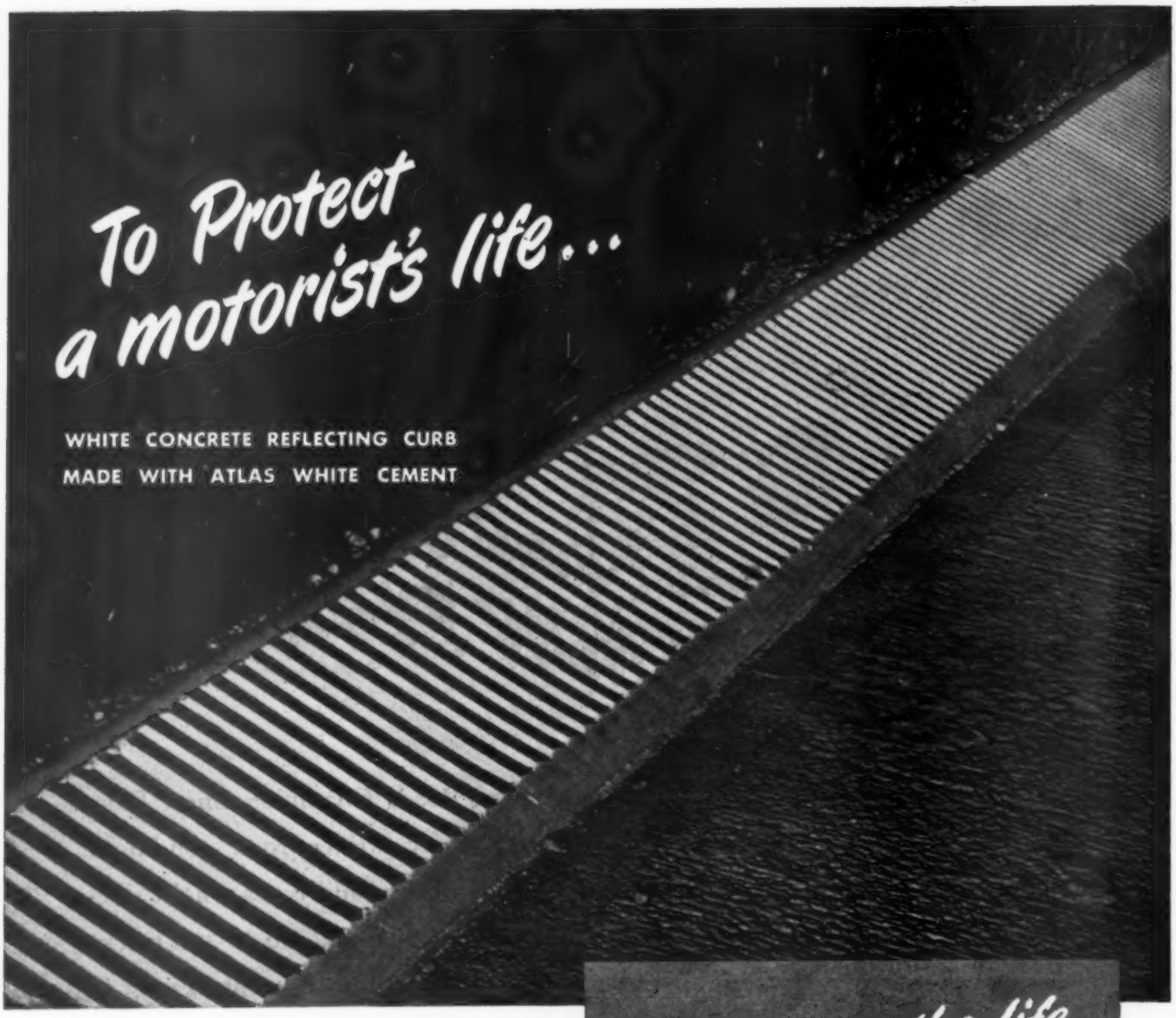

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AND, IF IT IS A LONG HAUL OVER DEEP SAND YOUR ONLY COMPETITION WILL BE SOME OTHER OWNER OF MISSISSIPPI WAGONS.

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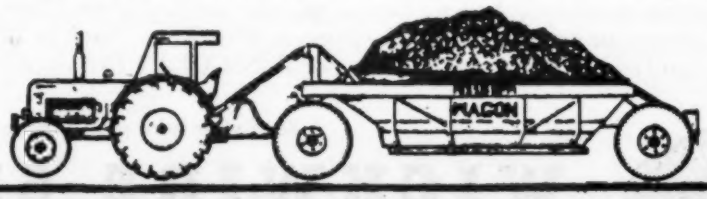

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Our wire rope engineers are always ready to help solve your wire rope problems. And we can supply the particular rope best suited to your needs for Wickwire Spencer Wire Rope comes in all sizes and constructions, standard lay or WISSCOLAY *Pre*formed.

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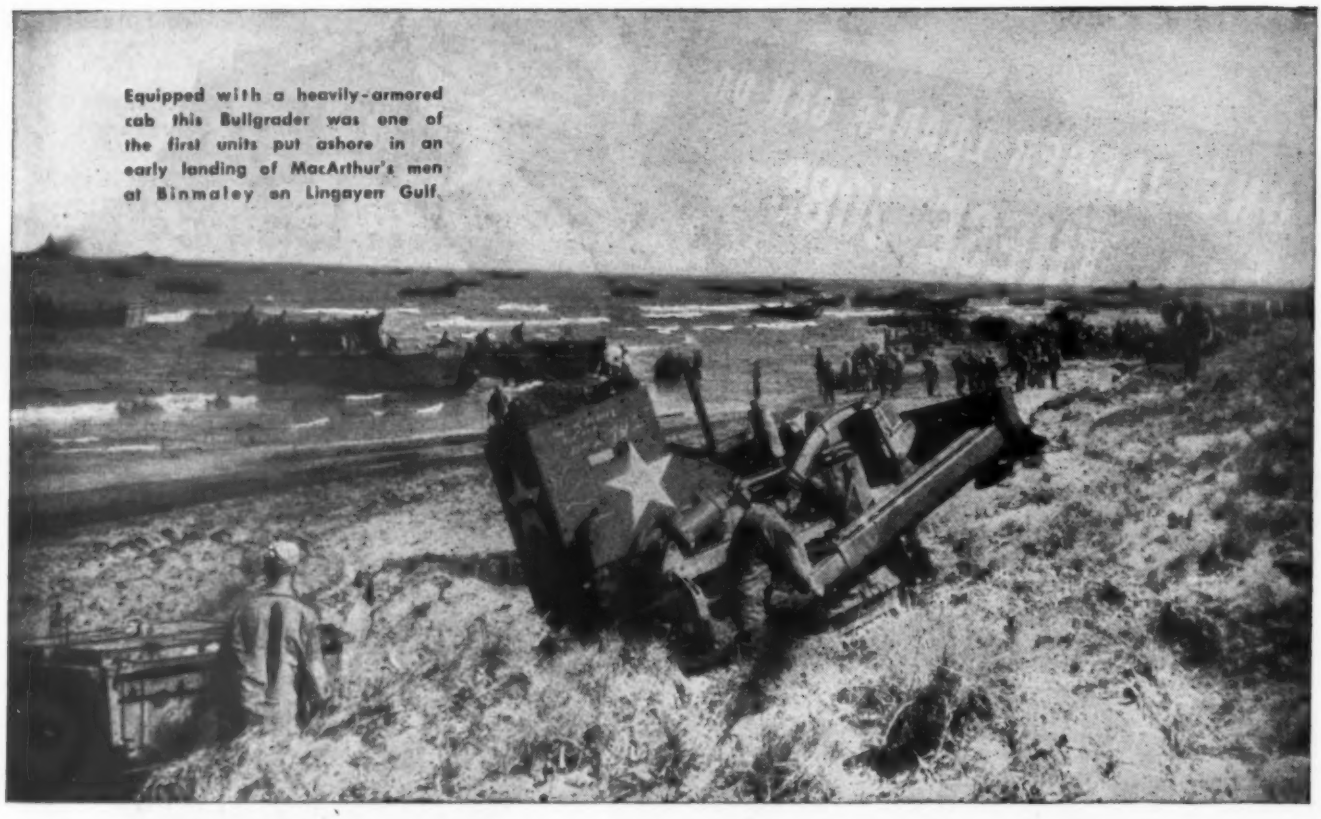

Equipped with a heavily-armored cab this Bullgrader was one of the first units put ashore in an early landing of MacArthur's men at Binmatey on Lingayen Gulf.

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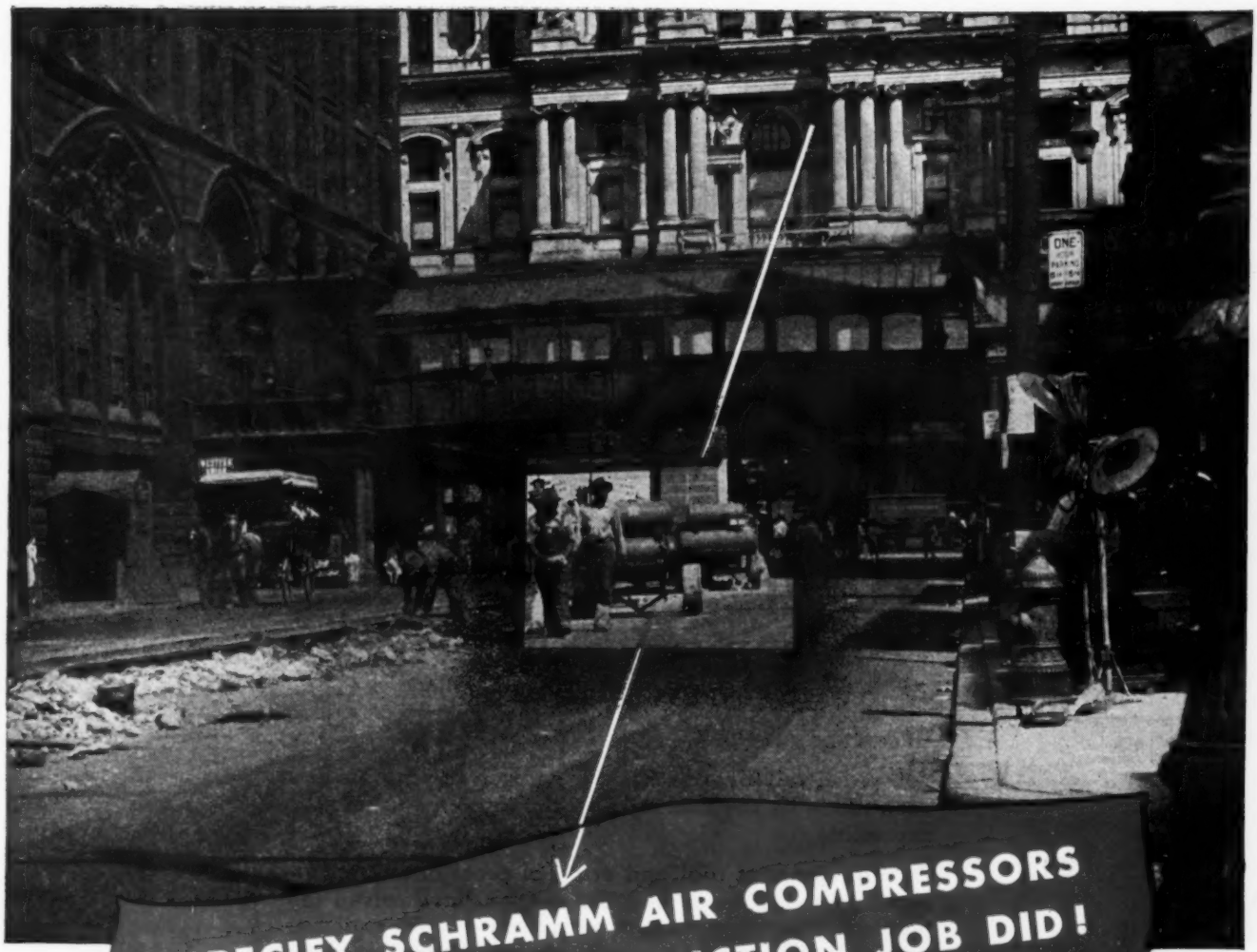

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Yet, practically every step in the march of progress has been made by the men who set out to do the seemingly impossible.

Through years of trial and error, of proof and improvement, men with ideas and imagination have solved the problem of building roads of native soils—"in place" materials. In so doing, they have eliminated the largest single element of cost. What this will mean in terms of low-cost roads is not yet fully realized by the public at large.

But it was realized by P&H Engineers. And they have been at work. Collaborating with leading research engineers and highway authorities, they have pooled their experience to develop equipment that simplifies the basic operations — controls the processing of native soils — performs the entire task at a *single pass*, leaving the road ready for compaction.

The P&H *Single Pass STABILIZER* has successfully completed its field tests — handling all kinds of commercial admixtures — in all kinds of soils. It is ready whenever you are ready — to reduce the cost of building base courses, light traffic roads, streets, airport runways, taxiways and parking lots.

Contractors or highway departments contemplating work of this nature in the near future, should investigate now.

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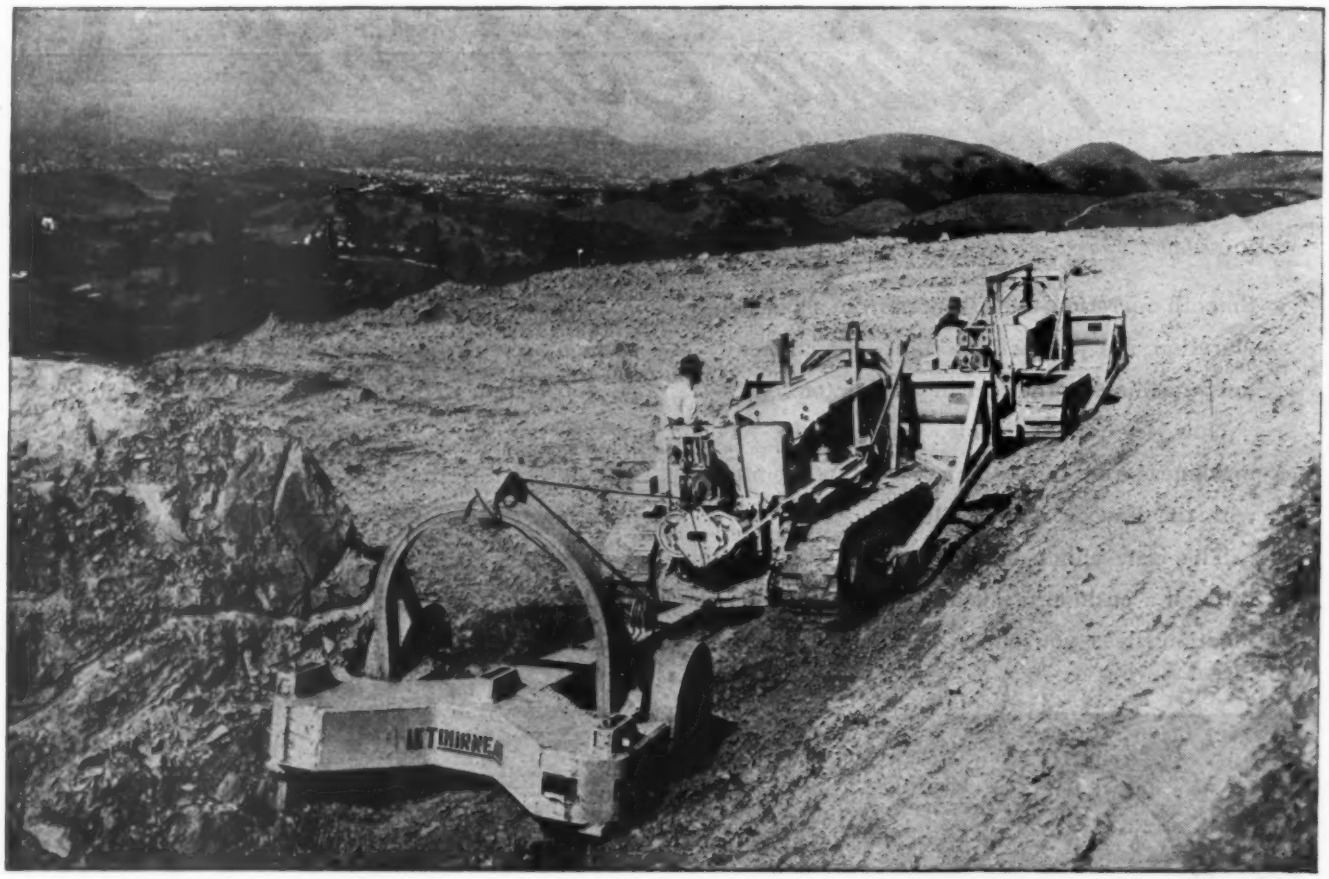

WAITING . . . 158,466 Miles of Roadwork

IMAGINE *fifty* transcontinental highways, or a road running *six times around the earth* at the equator. That will give you an idea of the estimated mileage of roads scheduled to be rebuilt, widened and relocated after the war. ***And this is only one item in an estimated $15 billion expenditure for postwar construction!***

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ROADS AND STREETS

July, 1945, Vol. 88, No. 7

Sand-Asphalt Practice in Mississippi

Details of a surface type that has proved economical in an area entirely lacking in stone aggregate

MOTORISTS driving through Mississippi on some of the routes paved during the period 1935-42 have had the pleasure of using roads of a relatively new type of highway surface that has been highly successful thus far. Built entirely of local sand (or sand-gravel) and asphalt, these roads are smooth riding, and firm, yet have an almost perfect non-skid texture, and are, thus far, able to carry trunk-line, heavy-duty traffic. Contracts during the period mentioned have averaged $12,000 per mile for 20-ft. widths and 5 in. thicknesses, this cost per mile including the base of sand-clay and gravel for stabilizing. Only nominal maintenance has been required.

Credit for the development of sand-asphalt construction cannot be claimed exclusively by the Mississippi state highway department, but Mississippi engineers feel that refinements and changes in previous practice worked out in the department have contributed largely to its success and popularity. The present methods are an outgrowth of the roadmix surfaces built in pure-sand areas in Florida and other states with liquid asphalt for binder. The present hot plant mixes using asphalt cement for binder were found to be more satisfactory in Mississippi on account of the frequent rains and also because the sand was not native to the sub-grade, as in some states. It proved to be just as cheap to erect a hot-mix plant, either in the pit or at some point between the pit and the road, as to haul the sand to the road. The latter method entails absorbing a considerable cost in waiting for the sun to remove sufficient moisture to start applying the asphalt, as well as a differential in the cost of the liquid asphalt as compared to asphalt cement.

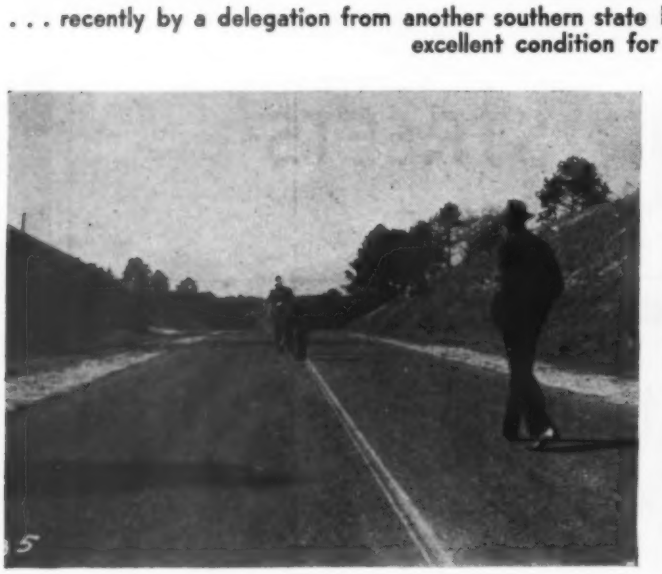
State-Wide Search for Materials

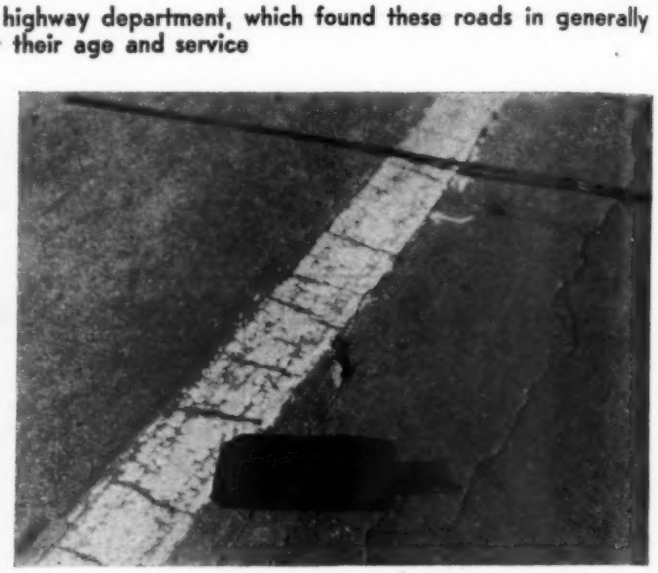
An intensive search over the entire state for deposits of material that could be called sand, sand-clay, sand-gravel, creek-run gravel, etc., was

Tandem operation of spreaders on Mississippi sand-asphalt project

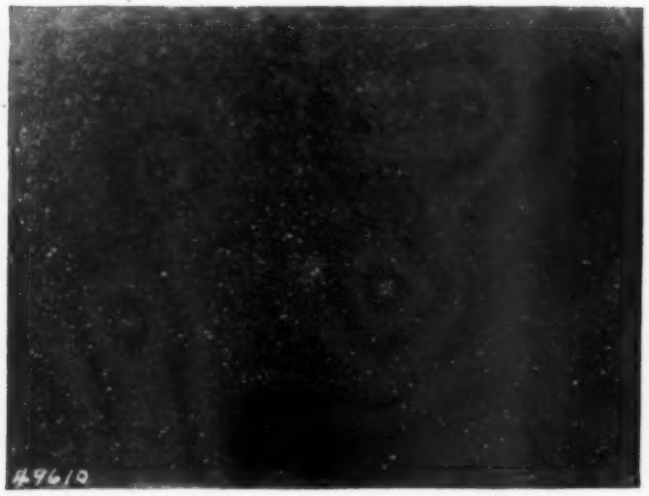
Photos Taken on Mississippi Sand-Asphalt Roads

. . . recently by a delegation from another southern state highway department, which found these roads in generally excellent condition for their age and service





(Left): Delegation making detailed surface examination. (Right): Effect of localized grade settlement in cut, Miss. Hy. 15 near Montrose



(Left): Crack across sand-asphalt base and surface. Recent trend to softer asphalts has eliminated cracking. (Right): Typical example of fine texture of sand-asphalt

made during the years 1928 to 1936. Any deposit of rock of any description was carefully examined. Only one deposit with any possibilities was discovered and after one or two experimental projects were built using this rock, it was abandoned. Therefore, it was very apparent that the only hope for Mississippi lay in the development of uses for the enormous quantities—well distributed throughout the state—of low-grade sandy materials that this survey revealed.

In compliance with the trend at that time, two expensive projects had been completed in 1933 and 1934, using asphaltic concrete containing not less than 50% crushed gravel, 8% mineral filler and 8% of 40-50 penetration asphalt cement, all mixed at the high temperature thought necessary in those days, and laid on 8-in. clay-gravel base. These surfaces immediately developed the characteristics of concrete, in that they were very hard and rigid. They also exhibited a surprising volume change. Cracks started as hairline checks, but the surface shrinkage soon developed the appearance that has more recently been called "map-cracking." This checking was closely watched, and it was soon very apparent that it was progressive.

Research Since 1934

A research division was organized in the Mississippi highway dept. in 1934 and a large number of short experimental projects were built as quickly as possible. The purpose was to test the various phases of stability, percentage of fines, gradation. etc., considered vital at the time. Representatives were sent to many other states and to bituminous conferences, to take full advantage of any new developments.

By the end of the construction season of 1936 it seemed very evident that all types of asphaltic construction that had been built in Mississippi were too hard and rigid, and the Research Department gave special attention to the matter of stability to find out how soft the asphalt in plant mixes might be yet still furnish satisfactory service. Mixes were made with asphalt cement as soft as 300 penetration and tested under heavy traffic with good success so long as the sand was sharp and well graded.

Asphaltic concrete on a clay-gravel base was kept in the specification as one of the four equal and competitive types required by Mississippi laws,

and a small mileage was built in 1934, 1935 and 1936, but the contractors soon found that the sand-asphalt design, adopted in 1936, with some modifications to adapt it to available deposits containing some coarse aggregate, was a more simple and practical surfacing, and were able to reduce their bids accordingly.

With the conviction that more flexibility in the surface was desirable, the penetration range in the asphalt cement was gradually increased, even on long projects. It was also developed that the old-line temperatures and high percentage of mineral filler were not necessary or desirable.

Present Sand-Asphalt Methods

After several years' experience in building many miles of sand-asphalt, the department has fairly well stabilized its design and construction policies to the point that the following construction methods and specifications may be considered representative:

Before preparing the plans for a given project local material surveys are made, in which all kinds of material are included, and preliminary samples of anything that may be found are sent to the laboratory for examination and tests.

From the standpoint of economy the primary factors entering into the location and investigation of the mineral aggregate pits are: (a) the position of the pit relative to the middle of the job; (b) its accessibility; (c) the relation between the thickness of the overburden and the strata suitable for use; and, (d) the ease with which the material may be dried. When the results of laboratory and field testing are favorable with regard to the four factors mentioned, options on the deposit are obtained by the Right-of-Way Department, which are later transferred to the successful bidder if he desires them, although he may use either deposits if they test satisfactorily.

The sands that predominate in Mississippi as natural deposits are usually underneath a layer of overburden varying from a few inches to several feet in thickness. This burden frequently contains an ideal mixture of sand and clay thus forming a sand clay suitable for use in the base. The pits are always somewhat stratified but since the material is usually friable, a mixing operation in the pit with a drag-line bucket is not expensive.

the deposit contains an appreciable amount of aggregate coarser than 10 mesh. Both of these designs contemplate laying the material in two courses, with a final compacted thickness 2½ in. to 3 in. for the primary course and 2 in. for the wearing surface. Since construction contracts generally include long mileages, with an average of 2500 to 2800 tons per mile, the contractors have moved in large-capacity plants sufficient to lay 1000-1500 tons per day, and of course, have experienced, trained personnel on all important posts on the job.

The general composition of the sand-asphalt mixture is covered by a

Proportions

Square mesh sieve	Primary or base course, per cent	Surface course, per cent
Aggregate retained on ¾" sieve	0	0
Aggregate retained on No. 4 sieve	.....	0
Aggregate retained on No. 10 sieve	0-30	0-10
Aggregate retained on No. 40 sieve	10-85	25-65
Aggregate retained on No. 80 sieve	55-95	55-85
Aggregate retained on No. 200 sieve	85-98	85-93
Bitumen (soluble in CCl_4) per cent of total mixture	5.5-95	7.5-12.0

Bases for all types of asphalt construction in Mississippi are usually built with stabilized sand-clay or clay-gravel. The Plasticity Index of these materials is carefully controlled, not being permitted to exceed 8, and the Liquid Limit not more than 25. The fraction passing the No. 200 sieve shall be less than one-half the fraction passing the 40 sieve. The stabilizer is generally a gravel that is imported from an entirely different source.

Two General Specifications

To properly cover the various deposits that have been found, two general specifications have been adopted. One, known as sand asphalt pavement, is used when the deposit contains nothing but sand. The other is called modified Sand Asphalt, where

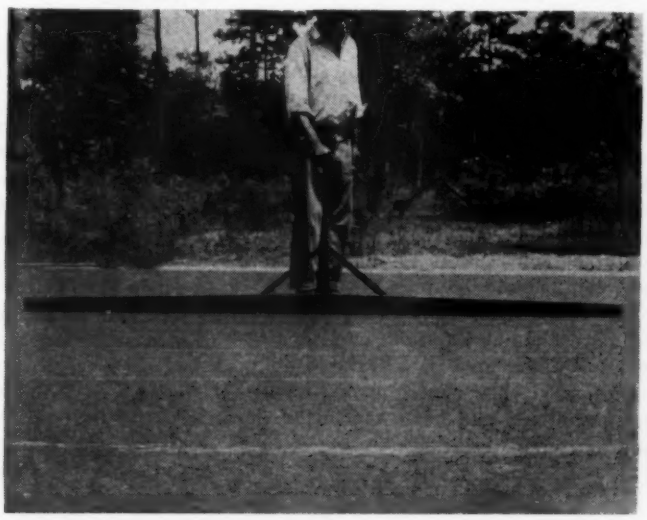
master formula, as follows:

Contractor Submits Mix

When the contract is awarded and the contractor has completed his own investigation as to the available materials, he submits his intended job-mix formula, indicating in writing the single definite percentage for each sieve fraction of aggregate and for asphalt cement, which he chooses as the fixed mean in each instance. Approval of this intended job-mix formula will be based upon the results of tests conducted by the laboratory, and will bind the contractor to furnish mixtures that will meet the formula thus set up for the project within the following allowable tolerances:

Plus or minus 10% for any sieve requirement above the No. 200 sieve.

Plus or minus 2% for the mineral



Rolling and checking surface, done as on any hot-mix job except that roller operator usually has side forms to watch out for in Mississippi

aggregate passing the No. 200 sieve.

Plus or minus 0.5% for asphalt cement.

Plus or minus 25 deg. F. for the temperature of the mixture at the time it is dumped from the mixer.

Samples of the actual mixtures in use are taken as many times daily as necessary and the mixtures must be maintained uniform throughout the project within these tolerances, unless adjustments have been approved by the laboratory and the engineer for newly discovered materials.

No bituminous materials are used except those that have proven satisfactory under service tests, and only one kind and grade will, in general, be used on any contract. The asphalt cement in recent years has been an AC 7 or AC 8, based on laboratory stability tests, but the trend is to the use of softer and softer asphalts.

Mineral filler is required to meet the conventional specifications as to gradation etc., and usually consists of limestone dust, or a processed loess from the Mississippi River areas when the job is nearby.

Wood Forms Left in Place

Most of the projects of this type that have been built in Mississippi have required timber forms, which are left in place. These are 3 x 6 in. longleaf pine timbers,—10 to 16 ft. in length. Forms are firmly set with the top at finish grade and staked at 20 ft. intervals, or closer if necessary, with the forms spiked securely thereto. For 5 in. compacted thickness this naturally requires a 1-in. trench for the bottom of the forms.

The forms are backfilled with suitable material for a distance of at least 2 ft. outside and 500 ft. ahead prior to placing the bituminous mixture. The alignment and grade is carefully checked immediately prior to the placing of any material against them.

Heating of bituminous material is always handled by means of steam coils in the tanks, and the temperature not allowed to exceed 350 deg. F. Aggregates are heated in revolving drum dryers with the temperature not to exceed 400° F. Temperature of mixed material is required to fall between 250 and 350 deg. F.

All proportioning on contract work to date has been done by scale-weights and plants usually have pugmill mixers, but rotary-drum mixers are permitted and have been used on one or two projects.

Hauling and Placing Materials

The usual precautions for protecting the material while hauling are required. The insides of truck bodies may be thinly coated with soapy water or a mixture of water and not more than 10% lubricating oil. Kerosene, gasoline or similar products are not permitted.

Observing a seasonal and weather limitation, bituminous mixtures of this type are not applied on a damp surface or at a temperature less than 40 deg. F. in the shade, or between November 15 and March 1.

Mechanical spreaders are used for placing the hot mixed materials. Most of the projects have been built with full-width machines, riding the timber forms, but a few long projects have been built, using half-width machines that ride the sub-grade, or previously laid base-course in tandem, without forms. On these, it was found that the temperature at the time of dumping must be very closely controlled. A load that had partially cooled off, due to delays enroute, to the bottom of the permitted range in temperature, would spread quite differently from one that had just left the plant. Because vertical edges cannot be obtained without the use of forms, it is necessary when using such spreaders that the base-course be laid from 6 to 10 in. wider than shown on the plans.

Since the mixture in the primary course contains fine material it is the practice to require a tack coat of hot asphalt cement at the rate of .025 to .05 gallon per square yard, applied not more than 30 hours after the primary course has cooled to atmospheric temperature, before the wearing surface is placed.

Compaction is obtained in the conventional manner, using tandem and three-wheel rollers, until a density of not less than 75% is obtained in the primary course and 87% in the surface course. The finished surface must also be such that it will not vary more than ⅛ in. from a 10 ft. straight edge, applied parallel to the center line of the pavement.

In conclusion, it seems that the experience in Mississippi has proven beyond reasonable doubt that any sandy material can be used, so long as all dirt or clay is scrubbed off the grains, in the dryer and carried up the stack. Sharp grains are desirable, as well as a good gradation, so that as high a percentage as possible of asphalt cement can be carried without loss of stability.

AASHO Cancels Annual Convention

Establishes Award for 25-Year Men; Notes on Recent Committee Meetings

The American Association of State Highway Officials has cancelled its 1945 annual meeting in recognition of the shortage of railroad passenger service. The action was taken by the Executive Committee of the Association at a recent meeting in Washington, and was announced by Herman A. MacDonald, of Massachusetts, President.

Normally held in November, the Association's meetings are attended by several hundred state and federal engineers, administrators and other highway officials. The convention city for the 32nd annual meeting this year had not been selected. Under the AASHO's constitution present officers are held over until another annual meeting. An executive meeting may be held in the fall.

At the recent Executive Committee meeting a report of a committee to revise the Association's constitution was received and approved. Such action must wait on the next annual meeting for ratification.

Revision in membership of all standing and special committees of the Association were approved. Also, new chairmen were appointed for two important standing committees: J. M. Devers, Oregon, Legal committee; and M. L. O'Neale, West Va., Road Construction committee. DeWitt C. Greer, Texas, was elected to the executive Committee, to fill a vacancy until the next annual meeting.

Of special interest was the reorganization of a committee on the use of radio equipment in highway departments. Membership is yet to be selected.

Of even more widespread interest, the Association has established an award of merit for 25-year men in highway departments. It is to consist of a certificate and a suitable lapel button, to be awarded each year to men of district engineer or department head rank or higher who have served 25 years with one state highway department.

In session of AASHO recently was the Association's Design Policy Committee, which made recommendation on the long-awaited standards for secondary federal-aid highways as well as for inter-state (so called interregional) highways. These recommendations, representing local decisions in all parts of the country, were approved by the Association's Executive Committee and will be ballotted on by the states, after which it is understood that the Public Roads Administration will issue a formal document giving consideration to these recommendations.

Editorial

Time to Go to School

"WHEN the war is over, I am going to go into the road contracting business and specialize in stabilization work."

This statement was made to the Editor of "Roads and Streets" recently by a practical-minded young engineer who has had considerable field experience in one type of low-cost road construction. He observed that grading and high-type paving work have long since become highly competitive and the woods are full of contractors who know how to slam into such work and play all the efficiency angles. Fresh from military and access projects involving high-type paving, these fellows haven't had a chance to get rusty, but can swing into action.

On the other hand, our ambitious young friend perceives that a long enforced holiday has occurred in low-cost road construction in this country since Pearl Harbor. He sees a huge need in his state for farm-to-market roads costing from $2,000 to $6,000 per mile to build.

He has read a lot on stabilization theory and is familiar with the steady advance in knowledge on the engineering and control side of various lowest-cost types. But he also knows that the knowledge of the average engineer or group of engineers on these types is spotty or one sided, at best, and that contractors who have translated the present specifications and practices into a fast-moving procedure and built up a smooth outfit are few and far between. He figures on wading in and making himself a nice living while showing force account exponents how to do it cheaper and better. Perhaps the fact that new and improved stabilization equipment is being groomed for the post-war market has something to do with his enthusiasm.

At any rate, this fellow has put his finger on an important educational job in the highway industry and profession. During the war years many engineers have gotten out of practice on stabilization and kindred subjects. Others have never followed it closely, and the influx of ex-G.I. newcomers is something else again.

Granular stabilization, with and without chlorides —soil-cement—soil-bituminous and other low-cost bituminous construction—are you up on the fine points? Along with rushing surveys and plans for the huge mileage of low-first-cost roads needed, state and county highway department engineers, as well as contractors, should brush up on the methods. This should include not only a study of published information, but also a fresh look at stabilization failures and successes in the home state and elsewhere.

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How Many States Will Be Ready?

WPB is easing restrictions as fast as conditions permit. Already grading and earth work may be carried on without limitations. Probably not later than September regulation L-41e will be rescinded, thus permitting the postwar highway construction program to swing into action. Such action on the part of WPB would not materially affect the 1945 construction program but would give ample time to arrange for the 1946 season. The size of the program would, of course, depend upon existing war conditions.

The time for beginning the postwar construction program is in sight, reminds Chas. M. Upham of the American Road Builders' Association. Then will be the time to take the plans off the shelf and get to work.

According to figures obtained by the ARBA *as of May* 1, 1945, *only seven states and the District of Columbia had sufficient plans for the first year's program.* These seven states are located north, east, south and west. By aggressiveness, initiative and ingenuity they have overcome the major deterrent in plan preparation, that of manpower shortage.

As the Postwar Highway Bill was originally introduced in Congress it called for federal expenditure of one billion dollars per year for three years—to be matched 50-50 by the states. During the hearings of the House Roads Committee, representatives from each of the 48 states presented testimony urging passage. Later, however, the amount authorized was reduced to 500 million dollars per year. In spite of the fact that a majority of the States urged the appropriation of a full billion dollars yearly for badly needed highways, we now find that the majority of the States are not ready to take up even half that amount for one year.

A tabulation is published in this issue. (See p. 87 for complete tabulation) From it you can see just where your State stands. If we are to have a large highway construction program in 1946 everyone in the highway industry and profession must put his shoulder to the wheel so that men will not go unemployed and that traffic demands may be met as rapidly as possible.

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Eighteen state legislatures have approved salary increases for state employees. In some of these states it is understood that highway department people will share. Congratulations!

JOB and EQUIPMENT IDEAS

Send in your contributions to this idea exchange and help road building progress. ROADS AND STREETS *will pay a minimum of $10.00 each for any publishable field or office methods or shop kinks. Why not pass this along to your staff and encourage them to send in brief "how we did it" descriptions, rough sketches or snapshots.*

Cable Keeps Dual Truck Wheels Clean

By R. P. DAY, CCM, USNR

Seabees working in coral pits in the Western Pacific islands, building roads and airfields, have solved a troublesome problem of truck tire failure by using a short length of cable and a little Yankee ingenuity.

Everywhere, coral rocks about the size of a doubled fist had the most persistent tendency to work up between the dual tires on dump trucks. Once a rock had worked in there, the constant flexing of tires on the highway soon developed bad sidewall bruises and ruined tires beyond repair. Furthermore, work was being pushed so rapidly that a truck driver simply didn't have time to get out and look after his dual wheels every few minutes.

Some anonymous Seabee finally hit upon the idea of removing one wheel, and installing a joined length of easy flexing preformed wire rope securely between the tires. Best diameter was ⅝ in. When the wheel was put back on, the cable served as a stationary wiper to catch all rocks as they lodged between tires, making it impossible for a rock to stay in more than one revolution.

Ordinarily this circular piece of rope was less than four feet in length, and had to be short spliced to make a very smooth job. The preformed wire strands proved easy to lay in place in a short endless splice.

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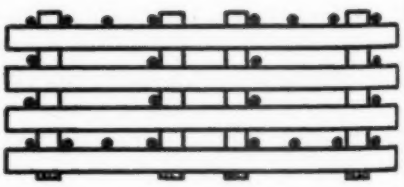
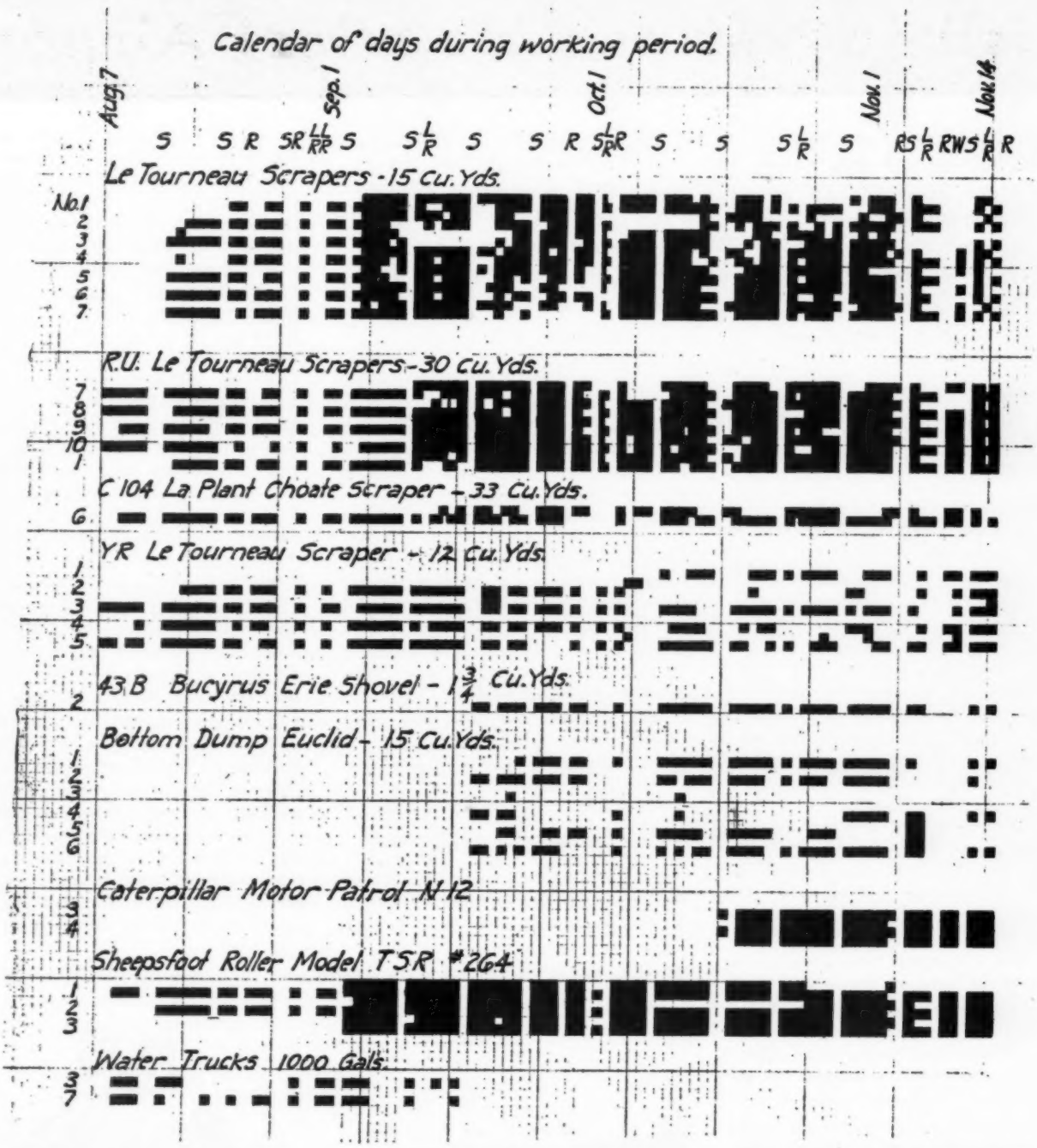
In crane operation use proper rope length for each job. A too-long rope means excessive overwinding and that increases wear greatly. Rope life can often be increased by reversing ropes end for end.



Simple Bar Support Aids Pier Cage Assembling

Reinforcing bars required in the tall pier columns of a bridge in Southern Ohio last summer, were pre-fabricated and spot welded by the contractor, Mauger Construction Co. of Columbus, O. Assembly of the cage, done in horizontal position, of course, and in this instance in pairs, was simplified by means of wooden bar racks shown in the illustration. These supports, spaced every four to six feet, served to hold the bars in accurate position while tie rods could be placed and tack welded.


Calendar of days during working period.
Aug. 7
Sep. 1
Oct. 1
Nov. 1
Nov. 14
Le Tourneau Scrapers - 15 Cu. Yds.
R.U. Le Tourneau Scrapers - 30 Cu. Yds.
C 104 La Plant Choate Scraper - 33 Cu. Yds.
YR Le Tourneau Scraper - 12 Cu. Yds.
43 B Bucyrus Erie Shovel - 1¾ Cu. Yds.
Bottom Dump Euclid - 15 Cu. Yds.
Caterpillar Motor Patrol No 12
Sheepsfoot Roller Model TSR #264
Water Trucks 1000 Gals.

Charted Work Record of Earth Moving Rigs

Why not chart the daily work record of such machine, along with notation of Sundays, rainy days and other bona fide reasons for idleness? Thus reasoned Project Engineer D. C. Miller on the Civil Aeronautics Administration's airport job at Mansfield, Ohio, let last August to Frank Mashuda, earth moving contractor.

Such a chart helps visualize quickly the extent of "down" time for each amount and for the fleet of similar units, such as scrapers, as a group. This in turn helps separate weather delays from delays from other causes and thus shows up the mechanical weak sisters, also to judge the degree in which the contractor's mechanics are or aren't able to keep up with their job. Such a chart obviously would be of value in weighing a contractor's request for a time extension.

How Engineer Miller's chart looked after three months is shown by the accompanying illustration. The symbol "S" at the top stands for Sunday, "R" for rain, "L — R" for light rain. Two lines charted for each machine are for day and night shift (note that double shift operations began about Sept. 3).

The effort recorded here, incidentally, represents a peak of 30,000 cu. yd. per day and daily average of around 10,000 cu. yd. through September and October in spite of plenty of hard pan and tight clay.

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When Loading Sticky Material

When loading trucks in sticky material, the operator can help keep the trucks coming regularly by dumping a little dry or coarse material (if available) into the bottom of the truck. The wet or sticky material is then put on top until the truck is loaded. The dry or coarse material helps the whole load slide out of the truck bed easily on the dump and thus keeps the trucks rolling without delay.

Visit to Nation's Heaviest Airport

How Harrison Construction Co., of Pittsburgh, is handling 5,200,000 cu. yd. job, nearly half rock. Horizontal drilling, steep haul roads, 20-24,000 cu. yd. daily production among construction highlights; phenomenally heavy cuts and fills, "reverse" fill design, heavy benching, and rounded fill corners among notable engineering features. Selected rock being stored for base construction.

By HAROLD J. McKEEVER
Editor, ROADS AND STREETS

A VISITOR to this project early in June would have wondered whether it was an airport leveling job or a mining operation, as he watched scrapers ski over 2 to 1 slopes and dumps and trailers go dusting down 20% haul roads into valleys 300 ft. below the shovels.

But an airport project it is. To Charleston, W. Va., only sizable state capitol city recently without airline service, the Kanawha County Airport is a dream soon coming true. And for Harrison Construction Co., of Pittsburgh, Pa., who have a $2,547,000 contract for grading the two-runway stage, it represents a real test of skill and efficiency under wartime handicaps. The Harrison firm won this job from a list of 9 bidders representing seventeen of the nation's largest and best known contractors (see accompanying tabulation). Beginning last October, Harrison moved 1,800,000 cu. yd. to June 20 in spite of a cold winter and wet spring which included 80 days of precipitation.

Harrison's key is to use plenty of the best modern equipment, and as of June 13 over 200 heavy units representing over a million dollars' investment was on the job or ordered.

The airport is to be graded, paved and equipped in several stages. When completed it will consist of a typical triangular layout of three 150-ft. runways 5,000, 5,500 and 6,000 ft. in length with about 400,000 sq. yd. of bituminous surfacing including aprons and taxiways. Further details of design as well as a word on the serious problems of site selection will be given later on in this article.

Partly Cleared Ground Encouraged Low Bids

Most of the site had been partially cleared under a previous contract. Harrison had to clear about 25 acres, for which hand methods were used to cut, clear and burn brush. Stumps in shallow fill area were dozed out. Harrison's lump-sum bid $14,000 was at considerable variance with other bids ranging from $4,000 to $113,500.

Members of the firm made the interesting observation that all bidders undoubtedly bid the big excavation item lower as a psychological result of the area having been largely cleared prior to the time of their investigation. The job "looked easier" than it would have had the bidders been required to climb around over the heavily wooded hills and ravines and make visual reconnaissance hampered by dense covering.

The present contract, representing stage I, consists of grading and drainage for two runways only. As shown in Fig. 3, there are three large and one small cut areas, the largest cut containing 1,500,000 cu. yd. and the largest fill of 2,100,000 cu. yd. extending along 1,500 ft. of runway.

Steep Haul Roads

The general scheme of movement from cuts to fills is simple. Much more complicated, however, is the matter of day-to-day location of haul roads and equipment operation. In the early stages shovels worked ledges that were 300 ft. or more above the lowest ravine filling levels. Due to layering of pan materials between stone strata there was little opportunity for scrapers to load downhill. But early-stage haul roads for both stone and dirt were among the steepest ever encountered by Harrison's men—up to 40% descending grades for scrapers and 25% for dump trucks on more temporary roads. Main haul roads—that is, those which could serve for several weeks between main cut and fill areas—are contoured to hold grades below 15% to 20% in order to save wear and tear on equipment.

The job will average about 40% rock, consisting of three layers of hard sandstone separated by shale beds. The county's engineers took borings at fifteen scattered points over cut areas, from which the various bidders estimated the proportions of rock, shale, hardpan and earth in making up their "unclassified" bid.

Seven 1¾ to 2½-yd. shovels are working at three or more ledge points on stone and shale. Shovels are loading a fleet of twenty-three 10-yd. rear-end dump trucks, and twelve 11 and 12-yd. botton-dump trailers, the beds of several of which were en-

Shovels ranging in size from 1¾ to 2½ yd. loaded to 11 and 16-yd. dump trailers and 10-yd. rear-end dump trucks

Grading Project

larged to 16 yd. (see photos). In contrast with the usual fleet of renters on a job this size, all trucks are contractor owned, a fact which has greatly speeded the work because of close control over mechanical condition of the trucks and performance of drivers.

The contractors considered use of a larger shovel, but settled on 2½-yd. or smaller because of greater flexibility in planning operations, easier transporting, and the fact that this size would be easier on the hauling equipment owned.

No Secondary Shooting

All secondary shooting is eliminated by the use of two truck-mounted 2,000-lb. skull crackers or "headache pills" working back of the shovels, combined with blasting skillfully so as to leave no excessively large rock fragments.

A fleet of 12-yd. tractor-drawn scrapers (up to 19 in number) is being worked as a single team or in two or more groups to scalp hill-top soil or work small areas requiring very steep climbing and descent. Nine 22 to 25-yd. scrapers also operate in one or more groups on more accessible yardage. Five push tractors serve the scrapers, usually working as single pusher with the aid of heavy rooters in shale beds.

Wagon and truck hauls have reached as much as 3,000 ft. The average material haul for the entire job is estimated to be about 1,200 ft.

The big scrapers are carrying a large part of the daily output, which is running as high as 24,000 cu. yd. in 10 hours. Four of these machines, 25-yd. units of the single-bowl type, had each moved a million yards on war projects long before being put on this job. The superintendent mentioned this in pointing out that the company has purchased little or had no new equipment in four years.

A 2,100,000-cu. yd. fill, 209 ft. high, will rise here to the shelf being cut near the top of the hill. Looking northeast along axis of NE-SW runway (see vantage point "Y" in Fig. 3). This early-stage progress photo was taken in May, 1945

"Reverse" Fill Construction

Fill construction here is of interest both as to embankment design and as to placement methods. A standard slope of 3 to 1 was adopted as being best for this project from the standpoint of slide safety and economy. Noteworthy is the "reverse" fill construction: Instead of putting the big stones in the face as rap rap, as is often done on heavy fills, large stones are laid up on the *underside* where hillside terrain is being covered. The natural slope is first benched with a shovel (see Figs. 1 and 2). Then stones up to the largest that the shovels and trucks can handle (up to 8 cu. yd. pieces) are laid up in the walls of the benches for a width of 5 to 10 ft. and also along the surface of any intervening natural slopes to be covered. This construction provides for filtration of water along the benches to drains at the fill edges or down the underside of the fill to the natural drainage ways at the bottom of ravines.

Special footer-type benches were built last winter across hollows at the toes of high fills (see Fig. 2). Taking the place of toe retaining walls and incidentally saving considerable yardage of fill material, these benches were cut 35 to 45 ft. wide and built up largely of big stones which would permit filtration of water.

The footer benches were built upon a comparatively steep slope, retaining

(See next two pages for photos. Article continues on page 79.)

WOW! (Figures for Present 2-runway Contract)

209 ft. max. fill height (toe to top)
158 ft. max. vertical fill depth
130 ft. max. cut depth
442 ft. extreme range in original ground elevation of working area
5,229,000 cu. yd. unclassified excavation (8,000,000 ultimately)
2,100,000 cu. yd. in largest fill
1,500,000 cu. yd. in largest cut
40% of the job is rock

Stones up to 8 cu. yd. in size (bigger'n this one) were trucked to the inner faces of benches—see text for details

(Left): Scraper haul roads were sometimes as steep as 40%. This load beginning a 200-ft. descent

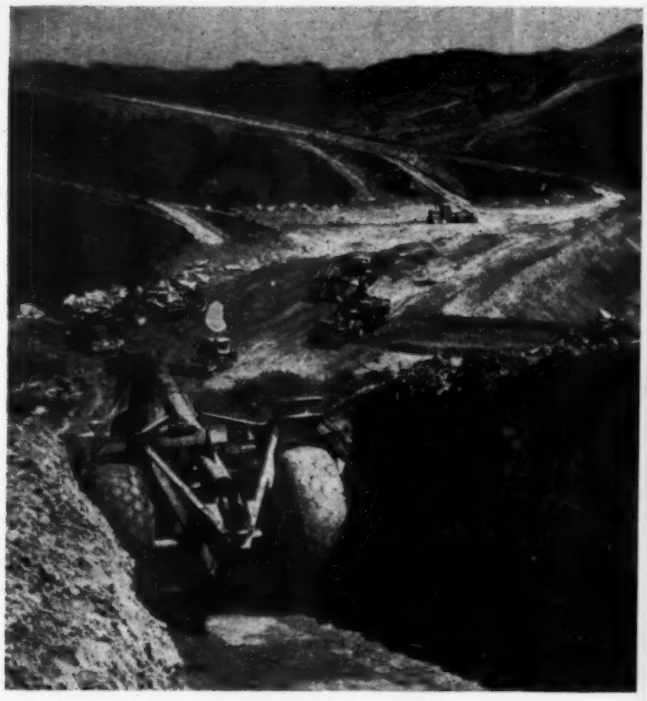
(Right): Building a new scraper road at 4 p.m. At quitting time a 2500-lb. blast will mess up the present road

The 2-ft. layers of shovel material are being compacted with a 13-ton smooth roller. The crane in the background is wielding a 1,000-lb. ball on the oversize chunks

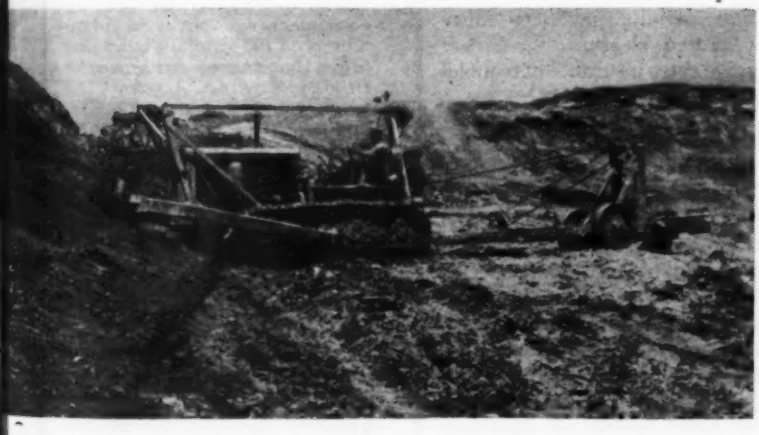
(Below) Main haul roads leading to fill (A) from cut areas (B) and (C), as shown in Fig. 3. These roads, gradually being covered this summer in building the 2,100,000-yd. fill, were pitched to the economic limit for all types of equipment

Automatic power fed horizontal drills did most of the drilling for blasting. This 6-in. hole was carried 45 ft. into shale in 12 minutes.

(Right): Six 22 and 25-yd. scrapers are circling their loads onto the fill, assisted by one spreading dozer and one push loader. Note haul road cut through shaley clay. Unit in foreground is one of four veteran "1,000,000 yarders" still going strong on this job



(Below): Shale beds gave the rooters all they could take



Another of Harrisons' seven shovels

Blast hole wired and ready as part of a 9-hole, 2500-lb. shot. Horizontal shooting is believed to be effecting a saving of hundreds of thousands of pounds of dynamite

EXTRA SPEED IN ITS FAST-CHARGING SKIP

There are many reasons why this Ransome 34-ft. E Blue Brute "Dual Drum" Paver has the reputation for laying more footage per day than any other paver. But let's start at the beginning . . . with the skip.

Because the drum that receives the charge has a larger opening than other pavers, the skip's throat is wider. Add a 56 degree skip slope . . . steepest on any paver . . . and you can see why the charge wastes no time entering the mixer drum.

SKIP IS FOOL-PROOF, TOO

Slotted pivot bearings that allow skip to adjust itself on uneven subgrade to prevent warping and twisting when batch trucks back into it . . . *6" grill* that prevents damaging foreign material from entering mixer with aggregate . . . *low overhead framework* that permits paver to move through limited clearances — these features give extra insurance of trouble-free operation and longer life.

OTHER EXCLUSIVE BLUE BRUTE FEATURES

This "Dual Drum" Paver also has *hydraulically-controlled boom bucket* for laying any part of load where you want it even while speedy *hydraulically-operated boom* is swinging . . . *renewable boom track* . . . *metal-to-metal spiral cut-off in tank* for continued precision of water measuring . . . *mechanically-operated batch meter* for all-season accuracy — all adding up to more footage per day and lower maintenance cost per year.

RS-1

KNOW YOUR BLUE BRUTES

Your nearby Blue Brute distributor will gladly demonstrate how Worthington-Ransome pavers and other construction equipment will put your planning on a bid-winning basis and prove that *there's more worth in Worthington*. Act now! His name is listed on page 79. The number beside his name indicates the Blue Brutes he carries.

1

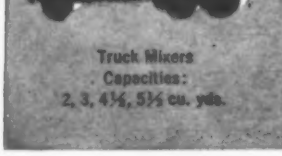
Blue Brutes include: Pavers, Concrete Spreaders**, Concrete Mixers, Concrete Placing Equipment, Big Mixers, Finishing Machines**, Pneumatic Placing and Grouting Equipment, Truck Mixers, Plaster and Bituminous Mixers, and Accessories.

2

Blue Brutes also include: Diesel, gasoline and electric driven Feather* Valve Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs; Rock Drills and Air Tools in a wide range of weights and sizes; Contractors' Pumps.**

*Reg. U. S. Pat. Off. **Postwar Products

BUY BLUE BRUTES



Truck Mixers
Capacities:
2, 3, 4½, 5½ cu. yds.

Portable Mixers
Capacities:
3½, 7, 10, 14 cu. ft.

Big Stationary Mixers
Capacities:
28, 56, 84, 126 cu. ft.

Pneumatic Grout Mixer and Placers
Pressures up to 150 p.s.i.

WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division
Holyoke, Mass.

Worthington-Ransome Blue Brute Distributors

By referring to the advertisement on page 78, you'll learn the meaning of the (1), (2) or (1-2) beside their names.

Ala., Birmingham (1) J. D. Pittman Tractor Co.
Ariz., Phoenix (2) Smith Booth Usher Co.
Ark., Fort Smith (2) R. A. Young & Son
Little Rock (1) Kern-Limerick, Inc.
Little Rock (2) R. A. Young & Son
Calif., Los Angeles (1) Garlinghouse Bros.
Los Angeles (2) Smith Booth Usher Co.
San Francisco (2) Coast Equipment Co.
Colo., Denver (2) John N. Meade
Denver (1-2) Power Equipment Co.
Conn., Hartford (2) The Holmes-Talcott Co.
New Haven (1) W. I. Clark
Waterbury (1) Contractors Supply Co.
Del., Smyrna (1) King-Burrous
D. C., Washington (1) M. A. Doetsch Machinery Co.
Fla., Jacksonville (1) Julien P. Benjamin, Inc.
Tampa (2) S. M. Regar
Ga., Atlanta (2) Tractor & Machinery Co.
Savannah (1) Morgans, Inc.
Ida., Boise (1-2) Olson Manufacturing Co.
Ill., Chicago (1-2) Chicago Construction Equipment Co.
Chicago (2) John A. Roche
Chicago (1) Thomas Hoist Co.
Ind., Fort Wayne (1) American Steel Supply Co.
Indianapolis (2) Reid-Holcomb Co.
Iowa, Des Moines (2) Electric Eng. & Const. Co.
Ky., Harlan (2) Hall Equipment Sales Co.
Louisville (2) T. C. Coleman & Son
Louisville (2) Williams Tractor Co.
Paducah (1) Henry A. Petter Supply Co.
La., New Orleans (1) Ole K. Olson Co.
New Orleans (2) Wm. F. Surgi Equipment Co.
Maine, Portland (1-2) Maine Truck-Tractor Co.
Md., Baltimore (1) Stuart M. Christhilf & Co.
Baltimore (2) D. C. Elphinstone, Inc.
Mass., Boston, Allston (1-2) Clark-Wilcox Co.
Cambridge (2) W. W. Field & Son, Inc.
Mich., Detroit (1) T. G. Abrams
Detroit (2) W. H. Anderson Co., Inc.
Flint (2) Gransden-Hall & Co.
Muskegon (1-2) Lakeshore Machinery & Supply Co.
Minn., Minneapolis (1-2) Phillippi-Murphy Equipt. Co.
St. Paul (2) D. L. O'Brien
Miss., Jackson (1) Jackson Road Equipment Co.
Mo., Clayton (1-2) The Howard Corporation
Kansas City (1) Brown-Strauss Corp.
Kansas City (2) Machinery & Supplies Co.
St. Louis (2) W. H. Reaves
Neb., Lincoln (1) Highway Equipment & Supply Co.
N. J., Hillside (2) P. A. Drobach
Newark (1) Johnson & Dealaman
North Bergen (2) American Air Compressor Corp.
N. M., Albuquerque (2) Bud Fisher Co.
Albuquerque (1) Morrow & Co.
Roswell (2) Smith Machinery Co.
N. Y., Albany (1-2) Milton-Hale Machinery Co.
Buffalo (2) Dow & Co., Inc.
New York (2) Air Compressor Rental & Sales
New York (1-2) Hodge & Hammond, Inc.
New York (1-2) Railroad Materials Corporation
Olean (2) Freeborn Equipment Co.
N. C., Raleigh (2) Carolina Tractor & Equipment Co.
N. D., Fargo (1-2) Smith Commercial Body Works, Inc.
O., Cincinnati (2) Finn Equipment Co.
Cleveland (2) S. M. Clancey
Cleveland (1) H. B. Fuller Equipment Co.
Cleveland (2) Gibson-Stewart Co.
Marietta (2) Northwest Supply & Equipment Co.
Toledo (1) Edmund Supply Co.
Toledo (2) M. W. Kilcorse & Co.
Okla., Oklahoma City (2) Townsco Equipment Co.
Oregon, Portland (2) Andrews Equipment Service
Pa., Allentown (2) H. N. Crowder, Jr., Inc.
Easton (2) Sears & Bowers
Harrisburg (2) N. A. Coulter
Oil City (2) Freeborn Equipment Co.
Philadelphia (1) Giles & Ransome
Philadelphia (2) Metalweld, Inc.
Pittsburgh (2) Atlas Equipment Corp.
Wilkes-Barre (2) Ensminger & Co
Wilkinsburg (1) Arrow Supply Co.
York (2) George F. Motters Sons
S. C., Columbia (2) Smith Equipment Co.
Tenn., Knoxville (2) Wilson-Weesner-Wilkinson
Memphis (2) Tri-State Equipment Co.
Tex., Dallas (1) Service Equipment Co.
Dallas (2) Shaw Equipment Co.
El Paso (2) Equipment Supply Co.
El Paso (1) Mine and Smelter Supply Co.
Houston (2) Dye Welding Supply Co.
Houston (1) McCall Tractor & Equipment Co.
San Antonio (2) Patten Machinery Co.
San Antonio (1) San Antonio Machine & Supply Co.
Utah, Salt Lake City (1-2) Landes Engineering Co.
Vt., Barre (1-2) A. M. Flanders, Inc.
Va., Richmond (2) Highway Machinery & Supply Co.
Wash., Seattle (1) Columbia Equipment Co.
Seattle (2) Star Machinery Co.
Spokane (2) Andrews Equipment Service
Spokane (1) Columbia Equipment Co.
W. Va., Charleston (1) West Virginia Co.
Fairmont (2) Interstate Engineers & Constr., Inc.
Wisc., Milwaukee (1) Mekeel Engineering Co.
Wyoming, Cheyenne (2) Wilson Equipment & Supply Co.

Buy Blue Brutes

Worthington Pump and Machinery Corp.

Worthington-Ransome Construction Equipment Division

Holyoke, Massachusetts

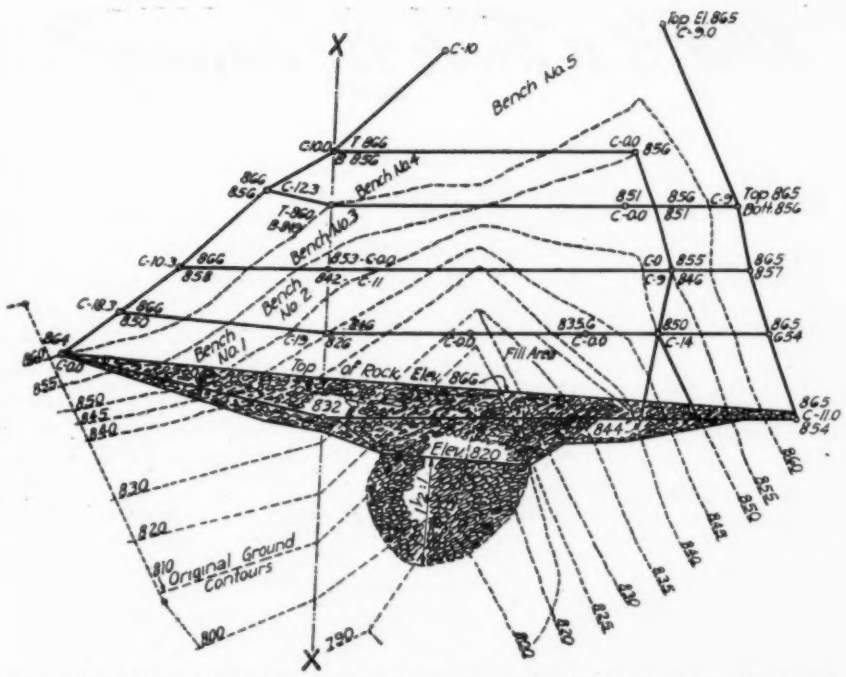


Fig. 1. Plan view of typical ravine showing benching plan for keying heavy fill into the hillsides

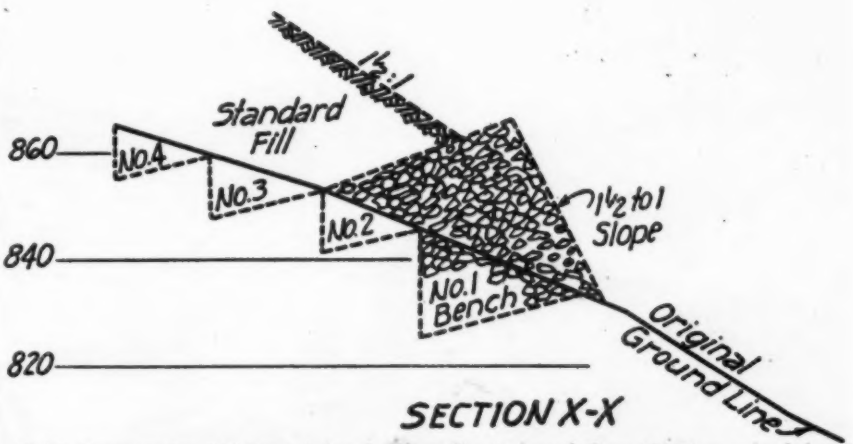


Fig. 2. Cross section "X" through benches (see Fig. 1 above.) Over 47,000 cu. yd. of shovel work has been needed to build 51 such benches to date

(*Continued from page* 75)

wall fashion, and subsequent fill material in some instances allowed to spill over the edge.

Other benches on up the hillsides are usually being cut with a 25-ft. floor, although some minor benches are made only 15 ft. wide. Altogether, 51 benches had been cut up to June 15, requiring blasting and shovel work nearly all the way and removal of 27,400 cu. yd., 40% stone.

For the bulk of the filling, to within 20 to 40 ft. of the embankment edge, run-of-shovel stone and scraper material are dumped on the grade, mixed and spread by bull dozers, and rolled in 2-ft. layers using 10 to 13-ton smooth rollers. Individual stones too large for such layering are broken up by a 1,000-lb. crawler-crane-mounted skull cracker.

Simultaneous with this operation, selected pan loads of shale and earth are dumped along the outer 20 to 40 ft. of the fill and rolled in 8-in. compacted layers with sheepsfoot rollers. In securing satisfactory densities on heavy fills considerable importance is attached to the vibration and compaction value of heavy rubber-tired and track laying equipment.

Sprinkling was seldom needed during the winter but five sprinkler trucks working from a 3,000-lb. pressure tank on the field have kept busy this summer. Haul roads alone need 6,000 gal. daily, and sprinkling must begin within one or two days after every rain.

▼

Horizontal Drilling and Blasting Methods

As revealed by fifteen test holes drilled one in the center of each high

What's a Truck for, anyway?...

Your truck is mechanical equipment in your business. As such it *makes or loses money* for your business every day you own it. The truck that costs least *at work* is the one to use.

As with any production machine—the *longer* your truck lasts—the *harder* it works—the *less it costs per unit of output*—then the more money it makes for you.

That's why there's nothing like a Mack.

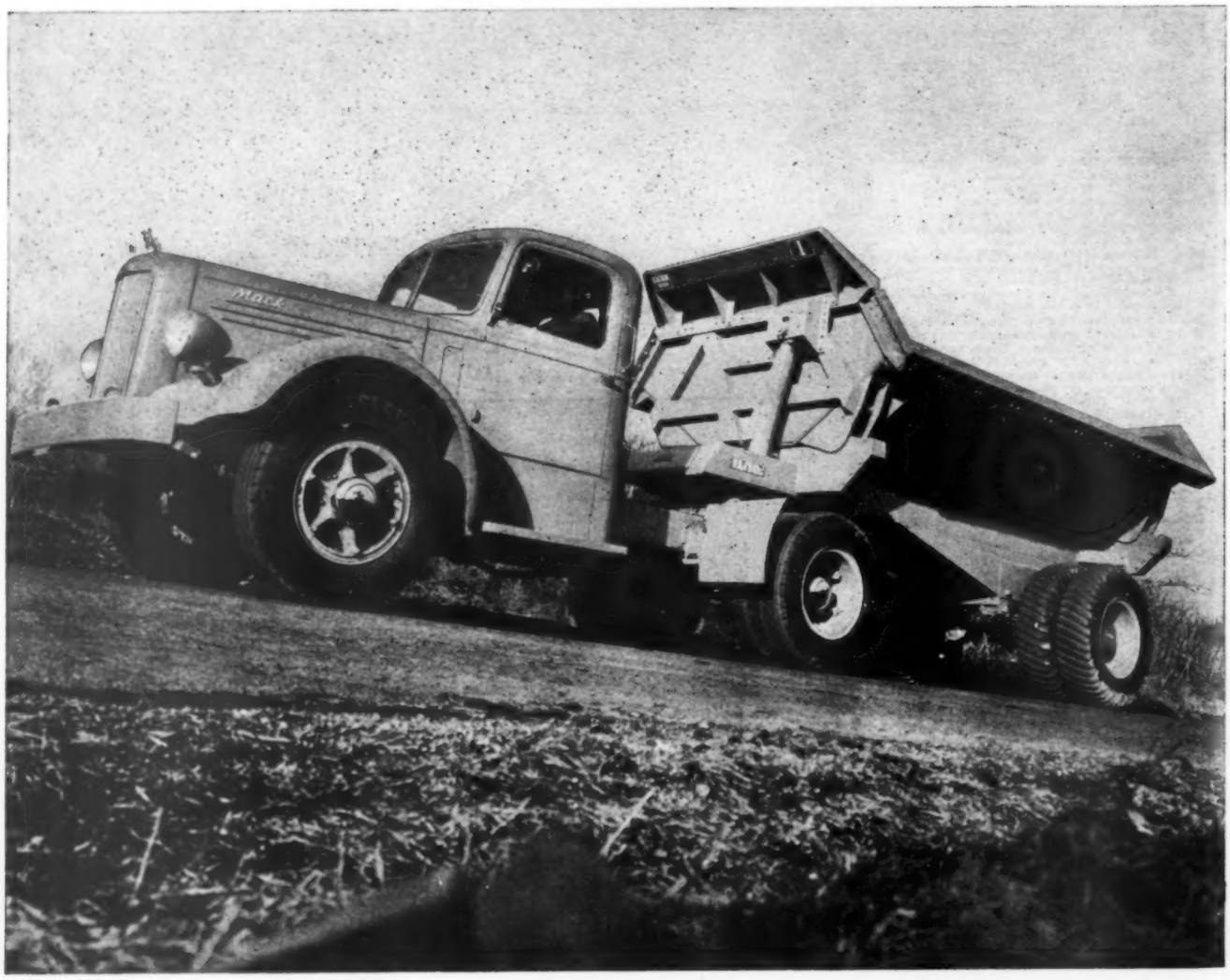
For the important thing about a Mack is not its name or its size or its weight or its price when new.

The important thing is simply that a Mack is built to work harder, longer, and at lower per-day cost, than any other truck in the world.

The reasons why it can do this, the Mack owner may never see—such as Mack wristpins finished to one ten thousandth of an inch—one of many Mack quality processes that insure better fit, and greater durability at work.

But the reasons are *there*—in every Mack truck. And the results are on the records of American business since 1900.

Macks have been *making money* for their owners for over 45 years. Now is the time to find what Macks can do for you.



★ BUY THAT EXTRA WAR BOND TODAY ★

Mack Trucks, Inc., Empire State Building, New York, N. Y. Factories at Allentown, Pa.; Plainfield, N.J.; New Brunswick, N.J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts.

Mack
TRUCKS
FOR EVERY PURPOSE
ONE TON TO FORTY-FIVE TONS

NEW Mack Trucks are available for essential civilian use. Ask for details.

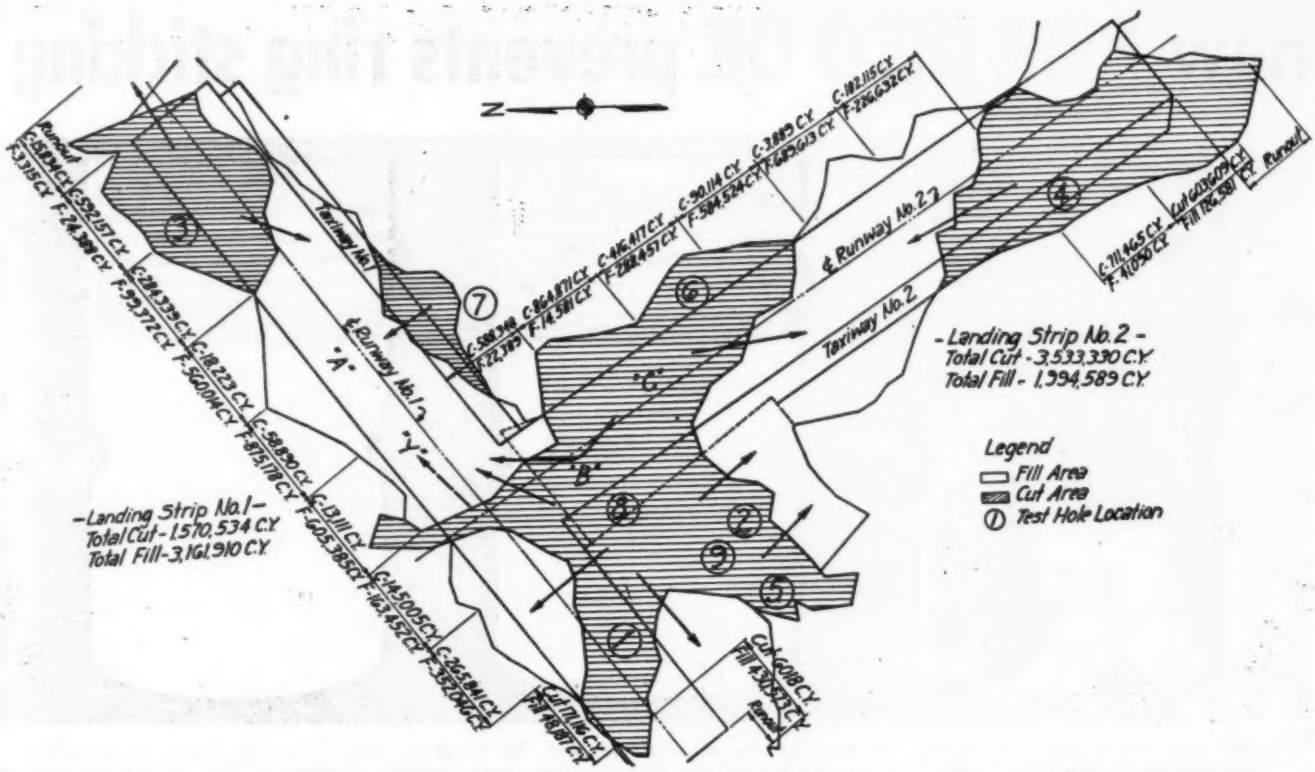


Fig. 3. General grading plan at Kanawha County Airport. Figures are approximate for bidding purposes and do not include shrinkage or swell factors. Grading quantities about as included in present contract excepting administration area quantities, which are reduced

point of ground, the upper strata to be excavated were found to consist typically of about 9 ft. thickness of hard sandstone usable as runway base, underlaid successively by 12 ft. of other rock and shale, another 7 ft. of "good" stone, 8 ft. of poor stone and shale, then a third layer of hard stone. Thus in high ground there is a minimum of 16 ft. thickness of sandstone in two layers from which about 300,000 cu. yd. of runway base material is to be reserved and stored in stockpile, as the filling job progresses.

Alternate rock and shale layers created a situation favorable to horizontal drilling and blasting. This method is being used for all but small special pockets, where 6 wagon drills are employed, powered by five 365-cu. ft. compressors. Horizontal shooting has proved so successful that only about 150,000 lb. of dynamite had been required up to June 20 in moving approximately 1,800,000 cu. yd. of material running somewhat less than half rock. The contractor reports excellent fragmentation by this method, which also leaves the broken mass in convenient position for efficient shovel loading.

Two horizontal power drills are employed, these being of two commercial "makes," one fitted with an automatic feed. The procedure is to go into the hillside or the face with parallel 6-in. holes, spaced generally from 10 to 20 ft. apart and carried 40 ft. or so back into the shale. The idea is to "lift" some 20 to 40 ft. thickness of material at a shot. The foreman decides spacing and depth of holes, basing his judgment on the thickness and character of the overlying strata, width of shovel path, size of stone desired, and area to be shot.

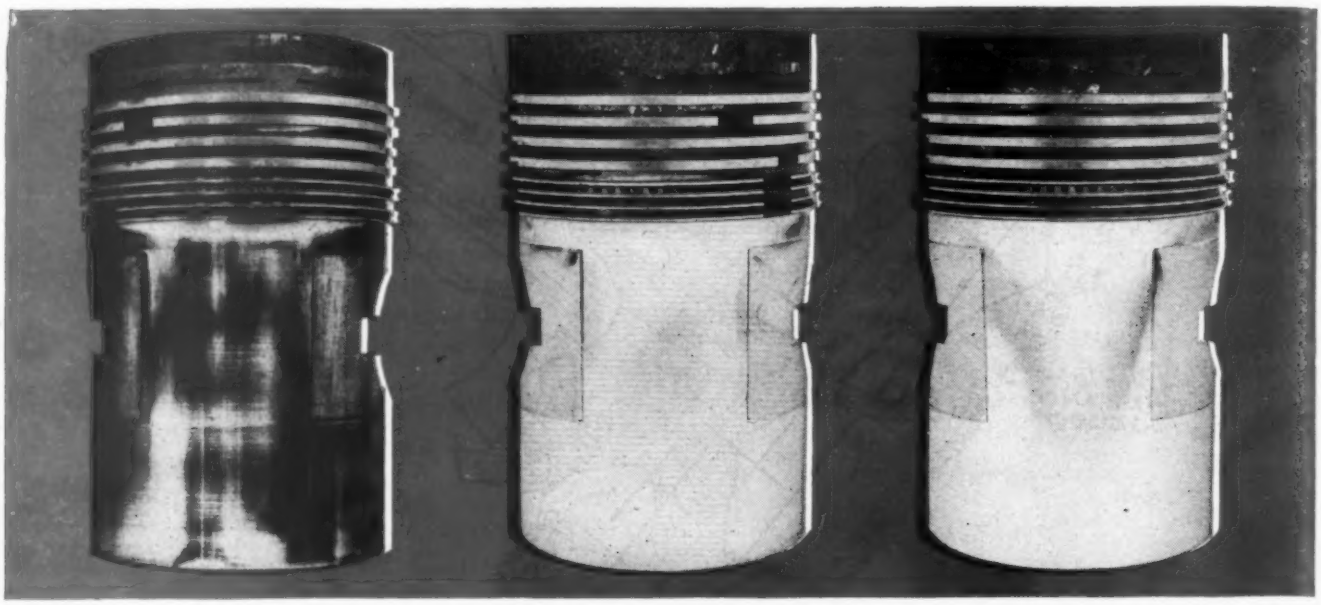
Dynamite used is mostly 40%, although some 60% has been tried. Several stick sizes have been employed, 4½ x 16 in. (10 lb.) sticks being favored in the horizontal holes. From 150 to 250 lb. of dynamite is used per hole. The practice is to alternate dynamite sticks with 4-in. diameter paper bags filled with earth or with the powered shale pulled out by the drill bit.

A typical blast observed consisted of 2,500 lb. of dynamite placed in nine parallel 45-ft. holes, three sticks of dynamite alternating with three bags of earth.

Six men are employed on the automatic drill, this number being needed to wheel the machine to new locations and set it up, handle the 6-ft. bit lengths, and insert and wire the charge. This mechanically fed unit bores through shale at the rate of 3 to 4 ft. per minute, usually completing a hole in 10 to 15 minutes. After working a few weeks with another horizontal drill not equipped with an automatic feed, the contractor had his mechanics devise a hydraulically operated feed which exerted steady pressure on the bit, greatly speeded drilling and saved one or two men.

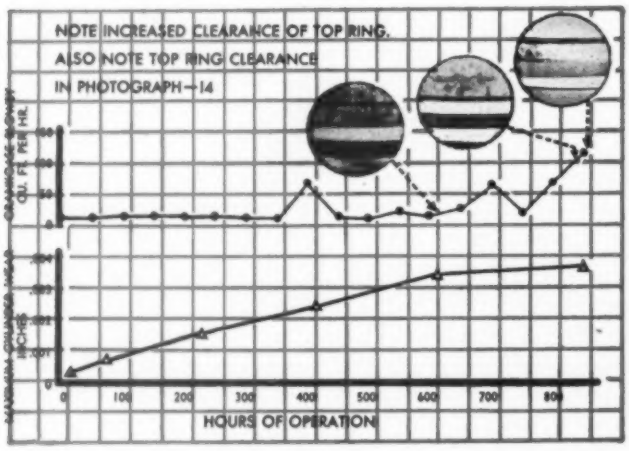
Pan material and sheepsfoot rollers placed fill in 8-in. layers near the fill edge (background), while shovel-run materials, dozer and smooth roller filled inner area in 2-ft. lifts

How RPM DELO OIL prevents ring sticking

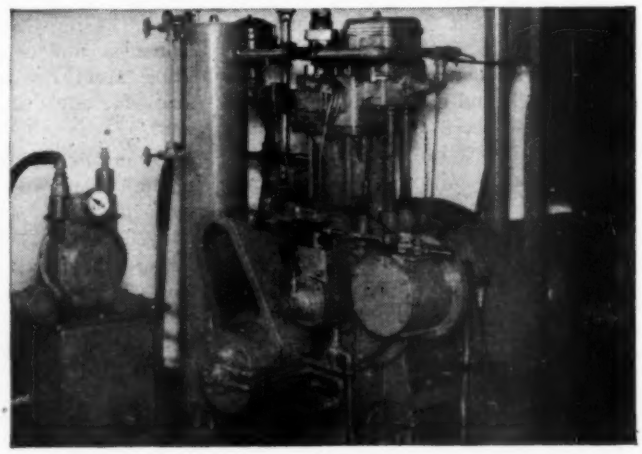


Even the finest uncompounded mineral oil will leave deposits on rings and skirts when operated under severe engine conditions. The above photo shows a test engine piston after 264 hours operation with the finest obtainable uncompounded Diesel engine oil.

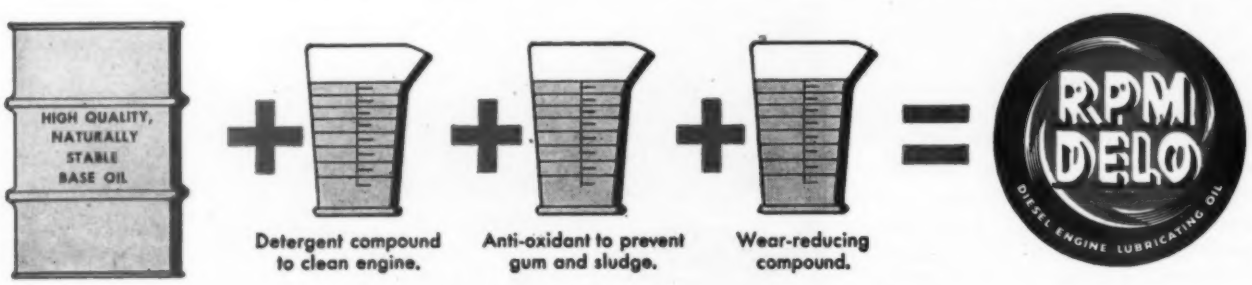
Here's the same test made with RPM DELO Oil, only this time for 1000 hours—more than double the 480-hour test required in current military specifications. The photographs above show both thrust and anti-thrust sides of a piston after a 1000-hour test with RPM DELO Diesel Engine Lubricating Oil. Note that RPM DELO Oil has almost entirely prevented any deposits on skirts. Dark areas around rings are only soft carbon, not sticky varnish. The compounding in RPM DELO Oil makes this possible by preventing the initial formation of sticky varnish.



How blowby caused by cylinder and ring groove wear increases rapidly is shown by the above chart. Excessive side clearance caused by ring groove wear allows the ring to rock in its groove and "bite" into cylinder walls. RPM DELO Oil checks this wear at the start by an adhering agent which makes it cling to hot cylinder walls.



This single cylinder laboratory engine is used to measure the ring-sticking characteristics of Diesel lubricants. The test record of RPM DELO Oil has been confirmed by sales of millions of gallons since its development. For more technical information on RPM DELO Oil, write for Booklet T-7, Standard of California, San Francisco 20, California.


HIGH QUALITY, NATURALLY STABLE BASE OIL
Detergent compound to clean engine.
Anti-oxidant to prevent gum and sludge.
Wear-reducing compound.
RPM DELO
DIESEL ENGINE LUBRICATING OIL

STANDARD OF CALIFORNIA

RPM DELO Oil has world-wide distribution under the names: RPM DELO, Caltex RPM DELO, Kyso RPM DELO, Signal RPM DELO, Imperial RPM DELO, (CONCENTRATE)

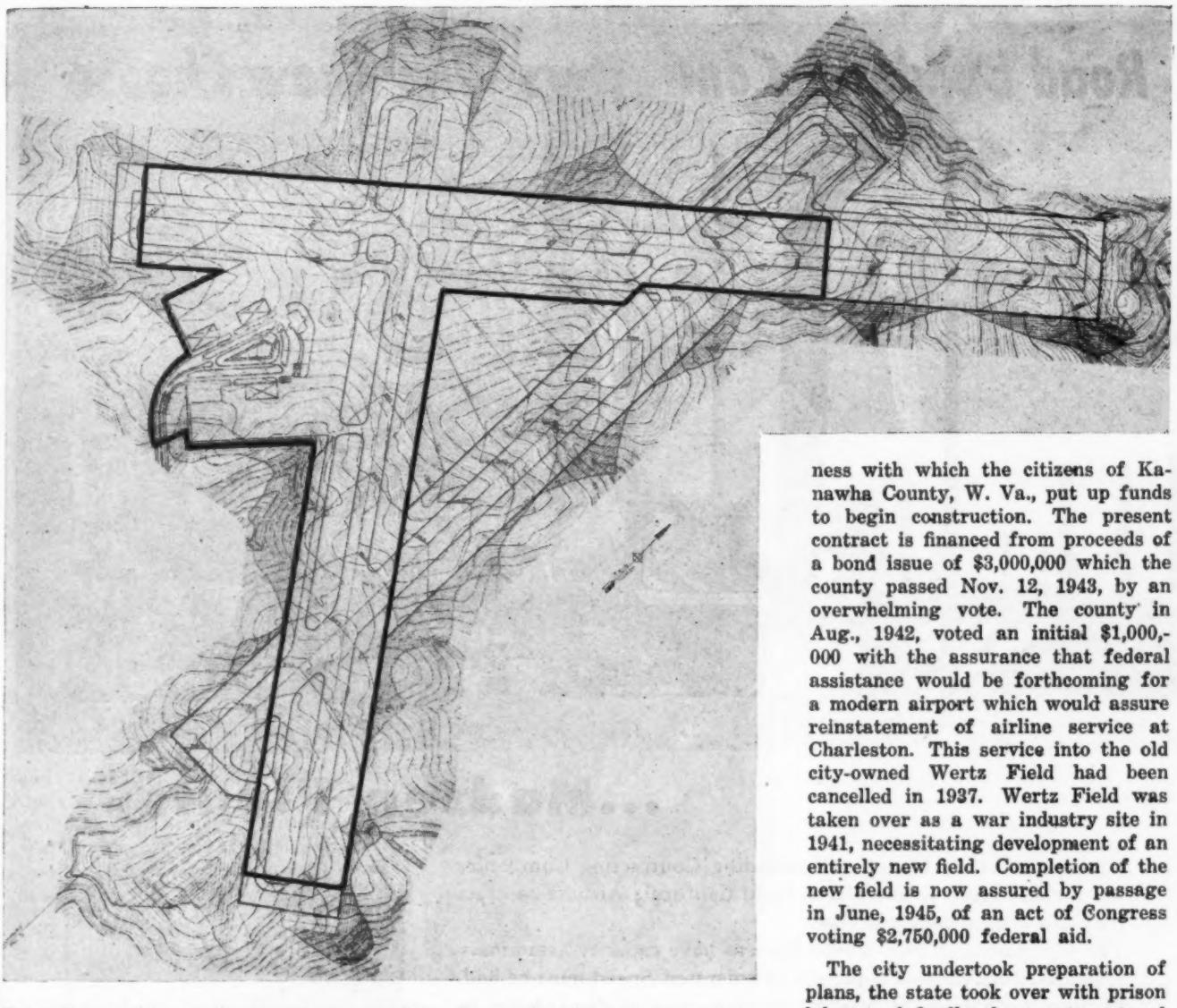


Fig. 4. Topographic map, showing extreme ruggedness of area selected. Heavy contour lines of ground are at 25-ft. intervals; heavy grading contours, 5-ft. intervals

Diesel Fuel Pumped In

Another bit of planning which is saving money, equipment and labor on this job is the use of a 1½-in. pipeline to bring in the 2,500 gal. of diesel fuel needed daily. This line, which extends from a rail siding up to the hill-top airport site, is 4,000 ft. long, rises 300 ft., and is operated by a triplex pump under 400 lb. pressure, feeding to three 2,000 gal. storage tanks. As a consequence, one fuel truck is needed only half time on the project, instead of two large trucks steadily plying up and down the hill. Daily oil consumption is checked by reading a meter.

The pipeline roughly parallels a 4,000-ft. construction access road which the contractor had to blast out of the hillside in part of his contract.

Contractor Has Labor Problem

The project was set up for 20-hour operation, and eleven portable light plants are kept on hand. But due to the scarcity of labor the contractor has worked only one shift. His payroll has run 180 men. Because of the unusual nature and size of the job the contractor has made special effort to time-clock and otherwise check the efficiency of his machines, especially the older tractors. The engineering staff has cooperated by putting two or three men on this work at the end of each month when their work slacks up.

The project occupies a special niche financially because of the readiness with which the citizens of Kanawha County, W. Va., put up funds to begin construction. The present contract is financed from proceeds of a bond issue of $3,000,000 which the county passed Nov. 12, 1943, by an overwhelming vote. The county in Aug., 1942, voted an initial $1,000,000 with the assurance that federal assistance would be forthcoming for a modern airport which would assure reinstatement of airline service at Charleston. This service into the old city-owned Wertz Field had been cancelled in 1937. Wertz Field was taken over as a war industry site in 1941, necessitating development of an entirely new field. Completion of the new field is now assured by passage in June, 1945, of an act of Congress voting $2,750,000 federal aid.

The city undertook preparation of plans, the state took over with prison labor, and finally the county entered in. The present project is sponsored by the Kanawha County Court, under whose Airport Section the original airport plan and much of the engineering development was carried out. In 1941 the Director of the Airport Section, foreseeing the difficulties in locating an economic and accessible site in the hilly region, began a long and patient series of reconnaissances. After studying all available topographic maps and scouting the area he flew and walked over some fifty possible sites. Preliminary observation narrowed these down to about ten locations. These he scouted further, using hand compass and

Harrison Construction Company Equipment on Kanawha County Airport as of July 1, 1945

40—D8 Tractors
4—D7 Tractors
1—D4 Tractor
8—Self powered scrapers (16 yd.)
19—12 yd. scrapers, tractor-drawn
12—22-26 yd. scrapers, tractor-drawn
7—Shovels (2-2½ yd., 1-2 yd., 4-1¾ yd.)
23—Rear end dump trucks (12 yd.)
6—DW-10's
12—Bottom dump trailers (11-16 yd.)
3—Rooters
5—Pushdozers
3—Angledozers
7—Bulldozers
3—Cranes (used with skull crackers)
3—Motor graders
6—Sheepsfoot Rollers (Dual units)
3—Flat Rollers (10 & 13 ton)
5—Welders
3—Compressors
2—Horizontal Drills
4—Wagon Drills
6—Jackhammers
11—Light Plants
16—Misel. Trucks

...Madsen Plants

When one of the Nation's Outstanding Contracting Companies bid for and received the March Field California Airbase contract they knew that *speed was vital.*

The equipment chosen would have to have capacity...stamina. expensive breakdowns could not be tolerated. Speed must be had. Madsen Asphalt — Oil Mix Plants have proved their ability to produce big tonnage, for that reason Madsen *Record Breaking* equipment was chosen.

Madsen Asphalt Plants have many exclusive Patented features — here are some of them:

1. Asphalt Pressure Injection System — asphalt is sprayed into the tumbling aggregates the mixer. Aggregates and oil are more thoroughly incorporated in a shorter time.

2. Twin-Shaft Pug Mill Mixer — mixes a capacity batch in 30 to 45 seconds. Extra large discharging gate discharges a batch in 4 to 6 seconds. This means 30 to 40 more batches per day.

3. Unit-Power Transmission — one power source for the complete mixing plant.

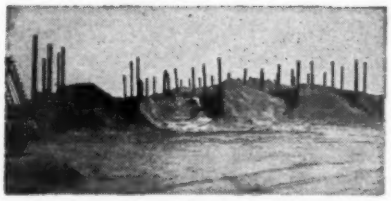
4. Jack Erection System — enables plant to be set up quickly and efficiently. No crane, ramps or extra devices are required.

5. All Madsen Plants meet legal highway height and width specifications for transportation on truck or low-bed trailer.

6. Every Madsen Asphalt Plant is an individually designed factory for producing all types of bituminous road surfacing materials; it is pre-suited to its operating site...local aggregate materials, mix specifications and is designed to give years of satisfactory service at an absolute low in maintenance cost.

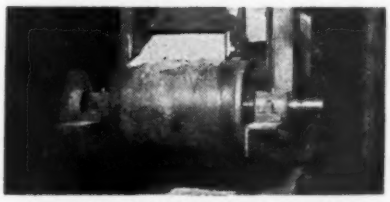
For prices, specifications, data sheets and illustrated literature, write: Madsen Iron Works, 5631 Bickett Street, Huntington Park, California, Dept. 90.

Contractor's name on request.



Crushed rock, sand and silt stock piles carefully segregated to assure accurate "Specification Plant Feeding Requirements." A Madsen Tunnel type plant feeding unit does the trick.

The Madsen Tunnel Type Plant Feeder is built in self contained sections which are of a standardized design each with trough and return rollers and feeders in place.



View of Main Belt Conveyor and one of two Belt type Sand Feeders which with four adjustable gravity flow type rock gates feeds all rock and sand to the plant in conformance to exact specifications.

MADSEN IRON WORKS • 5631 Bickett St. • Huntington Park, Calif.

Kanawha Airport, Grading and Drainage, Tabulation of Bids

Contractors or Contractor Groups Bidding			Harrison Construction Co., Pittsburgh, Pa. (Contract awarded Sept. 20, '44)	Murphy Construction Co., Camp Hill, Pa. Buffalo Gravel Corp., Camp Hill, Pa. Dutcher Const. Corp., Queenstown, Md.	Hunkin-Conkey Const. Co., Cleveland, O. The Hinman Bros. Const. Co., Pittsburgh, Pa. Shofner-Gordon & Hinman, Los Angeles Cal. Rhoades Bros. & Shofner, Los Angeles, Cal.	Utah Construction Co., San Francisco, Cal. Ralph E. Mills Co., Frankfort, Ky.	Peter Kiewit Sons Co., Omaha, Nebr. Morrison Knudsen Co., Inc., Boise, Idaho.	Carlo Bianchi and Co., Framingham, Mass.	S. J. Groves and Sons Co., New York City, N. Y. D. W. Winkleman Co., Inc., Syracuse, N. Y.	S. A. Healy Co., Chicago, Ill.	B. Perini and Sons, Inc., Framingham, Mass.
Description	Unit	Quantity	Unit Price	Unit Price	Unit Price	Unit Price	Unit Price	Unit Price	Unit Price	Unit Price	Unit Price
Clearing and grubbing	lump sum	.....	$ 14,000	$ 8,000	$ 113,500	$ 15,000	$ 7,500	$ 30,000	$ 50,000	$ 5,000	$ 4,000
Unclassified excava..	cu.yd.	5,221,656	.475	.535	.525	.56	.58	.58	.598	.76	.85
Concrete head walls.	cu.yd.	24	40.00	40.00	70.00	60.00	45.00	38.00			
Rein. conc. culvert pipe 15"	lin.ft.	3,100	2.75	4.02	6.00	3.50	5.75	4.00	55.00	30.00	35.00
Do 18"	lin.ft.	1,820	3.50	4.95	6.75	4.50	6.50	4.00	5.00	3.00	2.90
Do 24"	lin.ft.	288	4.50	6.90	9.15	5.50	8.00	5.50	6.00	3.60	3.65
Do 30"	lin.ft.	524	6.00	10.75	12.50	7.50	10.00	7.50	9.00	5.10	5.00
Corr. metal pipe 15".	lin.ft.	3,376	3.00	4.00	6.20	4.00	4.00	3.50	11.00	6.00	6.80
Do 18"	lin.ft.	600	4.00	4.90	7.25	5.25	5.00	4.00	5.50	2.70	2.60
Do 24"	lin.ft.	1,580	6.50	6.75	10.50	7.00	7.50	6.00	6.50	3.90	3.85
Inlets complete	each	47	140.00	90.00	150.00	85.00	130.00	150.00	9.50	6.60	6.10
Tile underdrains 6".	lin.ft.	1,500	.90	1.96	3.50	2.00	3.00	2.50	140.00	65.00	65.00
Do 8"	lin.ft.	1,500	1.10	2.21	3.70	2.25	3.25	3.00	2.50	3.60	1.25
Tile outlets 6"	lin.ft.	150	.80	1.88	3.00	1.50	3.00	2.00	3.00	4.80	1.40
Do 8"	lin.ft.	150	1.00	2.18	3.20	1.75	3.25	2.00	1.50	2.70	.60
Grouted rubble spillway	lin.ft.	300	2.00	2.55	15.00	10.00	6.00	5.00	2.00	3.60	.75
Totals			$2,547,820	$2,870,605	$2,961,770	$3,006,692	$3,120,915	$3,125,762	5.00	12.00	6.50
									$3,262,979	$4,036,726	$4,493,791

pacing distances to measure ridges and roughly estimate the excavation quantities. Before finally deciding on the site chosen he spent two weeks walking contours at 30 ft. intervals until he had a map from which a feasible layout of accurately determinable cost could be developed.

The County Court then acquired 743 acres for this field, located up out of the river valley at an elevation 350 ft. above the city and on top of a ridge some 4 miles highway distance from the business district.

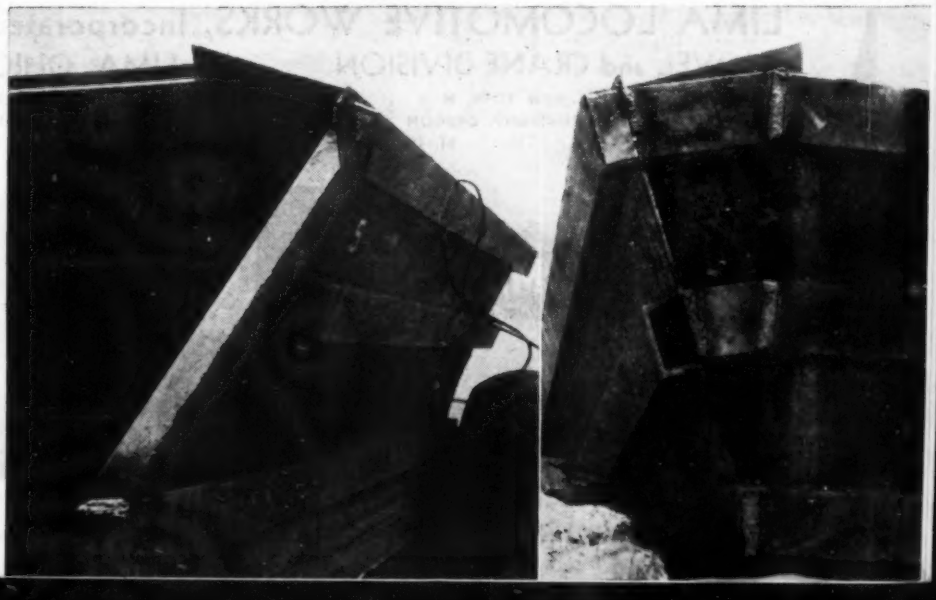
The field is to be paved under CAA specifications. Runways designed for 87,000-lb. planes are to consist of an 18-in. layer of clean selected stone placed in three rolled layers below subgrade level; a 3-in. leveling course of crushed stone; 6 in. of crushed stone base; and 2½ in. of hot-mix asphaltic concrete placed in two layers.

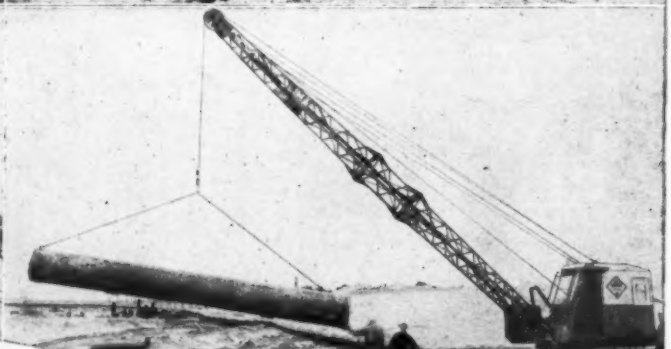
In order to reduce the fill quantities one runway was built 200 ft. short of ultimate design length, this step saving 800,000 cu. yd. Another saving of 380,000 cu. yd. of fill was effected by the novel step of rounding the fill to a radius of 100 ft. at all corners of runway strip ends. One such radius alone saved 134,000 cu. yd. of earthwork due to the steep drop-off of the natural ground.

Surface drainage of the field is to be provided for by inlets spaced about 250 ft. in excavated areas and slightly greater distances on fills. Storm water is to be carried from collection points to natural ravines or gullies in corrugated metal pipes placed underground down the slopes (aided by filter effect of big stones as aforementioned). Tile underdrains are placed at re-entrant corners of benches and outletted. Subgrade drainage will follow the usual pattern runway of edge drains and laterals.

Snapped at the Airport job: Fred Alley, county airport engineer; Martin W. Wise, genl. supt., Harrison Const. Co.; and Harold J. McKeever, editor of "Roads and Streets"; also L. S. Wescott, asst. chief engr.; R. Truzzie, job supt.; Herman Snyder, all of Harrison

How several wagon beds were enlarged from 11-yd. up to 16-yd. heaped capacity by welding the side plates in battered position





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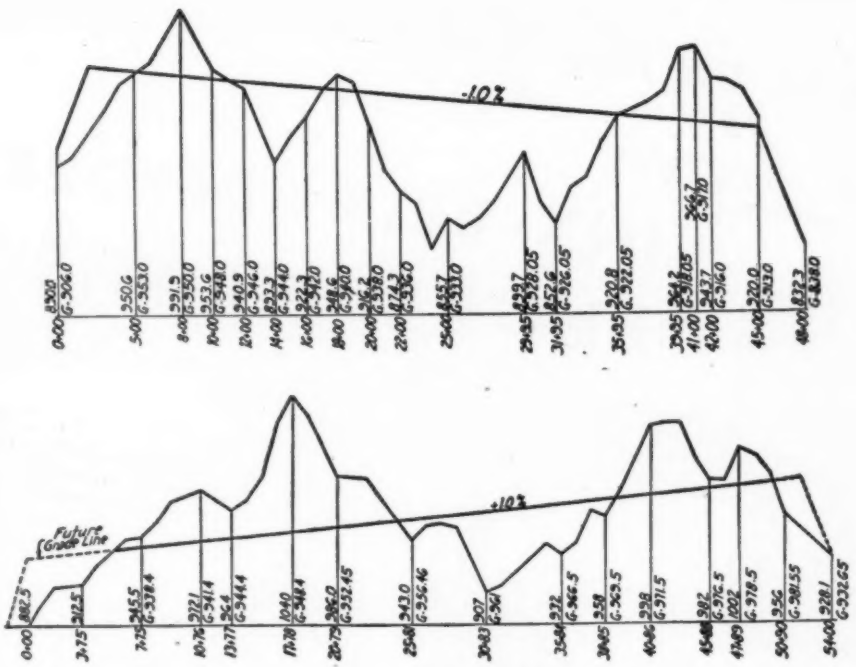

Fig. 5. Profiles of runways, further visualizing the heavy excavation required

Status of Planning by State Highway Departments as of May 1, 1945

(*See Editorial in This Issue, Page* 71)

	Projects Ready May 1, 1945		Federal Aid Apportionment	Total Federal Aid and State Funds
	Dollars	Miles		
Alabama	$ 5,000,000	175	9,751,000	$19,502,000
Arizona	6,000,000	164	5,731,000	11,462,000
Arkansas	.....	...	7,520,000	15,040,000
California	71,388,000	...	22,336,000	44,672,000
Colorado	11,460,000	248	7,701,000	15,402,000
Connecticut	15,400,000	138	4,148,000	8,296,000
Delaware	3,300,000	87	2,033,000	4,066,000
Florida	8,214,000	133	7,005,000	14,010,000
Georgia	4,174,000	...	11,587,000	23,174,000
Idaho	2,633,560	58	4,938,000	9,876,000
Illinois	23,000,000	260	23,189,000	46,378,000
Indiana	16,500,000	225	12,116,000	24,232,000
Iowa	.....	...	11,173,000	23,346,000
Kansas	20,600,000	750	10,758,000	21,516,000
Kentucky	7,324,000	60	8,910,000	17,820,000
Louisiana	7,607,000	81	7,417,000	14,834,000
Maine	5,800,000	104	3,916,000	7,832,000
Maryland	7,950,000	56	4,803,000	9,606,000
Massachusetts	.....	...	10,377,000	20,754,000
Michigan	16,000,000	193	16,684,000	33,368,000
Minnesota	22,000,000	1,050	12,442,000	24,884,000
Mississippi	no estimate possible		7,976,000	15,952,000
Missouri	8,022,763	297	14,394,000	28,788,000
Montana	8,000,000	200	7,961,000	15,922,000
Nebraska	8,565,000	690	8,428,000	16,856,000
Nevada	3,410,000	109	4,854,000	9,708,000
New Hampshire	1,303,700	11	2,306,000	4,612,000
New Jersey	25,000,000	75	9,464,000	18,928,000
New Mexico	3,715,000	123	6,406,000	12,812,000
New York	100,700,000	715	33,994,000	67,988,000
North Carolina	7,960,000	229	11,373,000	22,746,000
North Dakota	5,094,000	163	5,988,000	11,976,000
Ohio	23,000,000	320	20,143,000	40,286,000
Oklahoma	12,000,000	250	10,171,000	20,342,000
Oregon	12,000,000	250	7,090,000	14,180,000
Pennsylvania	.....	...	25,044,000	50,088,000
Rhode Island	3,000,000	23	2,957,000	5,914,000
South Carolina	19,500,000	1,082	6,220,000	12,440,000
South Dakota	5,750,000	550	6,268,000	12,536,000
Tennessee	2,000,000	...	10,036,000	20,070,000
Texas	65,000,000	2,095	28,775,000	57,550,000
Utah	3,000,000	...	4,654,000	9,308,000
Vermont	2,050,327	24	2,015,000	4,030,000
Virginia	17,000,000	330	8,802,000	17,604,000
Washington	9,000,000	180	7,415,000	14,830,000
West Virginia	8,338,500	181	5,360,000	10,720,000
Wisconsin	15,000,000	400	11,753,000	23,506,000
Wyoming	5,000,000	200	4,832,000	9,664,000

Acknowledgment

Much of the early planning and design work was performed by Fred Alley, County Airport Engineer, under the direction of the Kanawha County Court, Carl C. Calvert, president, and advised by a citizens committee, chamber of commerce and other groups. Whitman, Requardt & Associates, engineers, of Baltimore, were retained in the development of the Master Plan of which the present contract represents the first stage. Joseph J. Donahue is resident engineer. Paving and other latter-stage improvements will be supervised by Region 1, office of Civil Aeronautics Administration. Harrison Construction Co., of Pittsburgh, present contractors, are represented by Martin W. Wise, general superintendent, and R. Truzzie, job superintendent.

▼

Indiana County Lets 13 Bridge Jobs

Thirteen bridge replacement and repair projects that couldn't wait the war out were let in June by Marion County (Indianapolis), Indiana. All the work went to R. L. Schutt, Indianapolis bridge builder. Individual jobs included deck or abutment repairs, widening to eliminate traffic hazards, completion of small structures begun under WPA, replacement of unsafe structures on spans lost in floods.

Contractor Schutt's low bid of $79,779.00 made the front pages of Indianapolis newspapers because of being just 13 cents under the engineer's estimate.

Good workers are still very scarce in the Indianapolis area, and specifications had to be relaxed on completion guarantee and other details in order to attract bids.

Paul R. Brown, Marion County Surveyor, and his staff have construction plans well along for many new bridges, large or small, in a post-war program for which a million dollar bond issue is proposed. The largest project is a 750-ft. bridge to replace a 3-span covered bridge. About $500,000 is needed for further repairs of existing bridges.

▼

Airport, Panama City, Panama

Department of Public Works, Republic of Panama, Panama City, awarded a contract for design, engineering construction and inspection of airport, with 2-story, concrete terminal, and maintenance shops to F. H. McGraw & Co., Panama City, and New York, N. Y. The estimated cost is $7,000,000.

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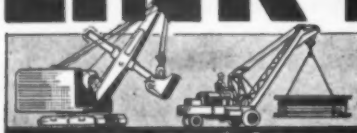

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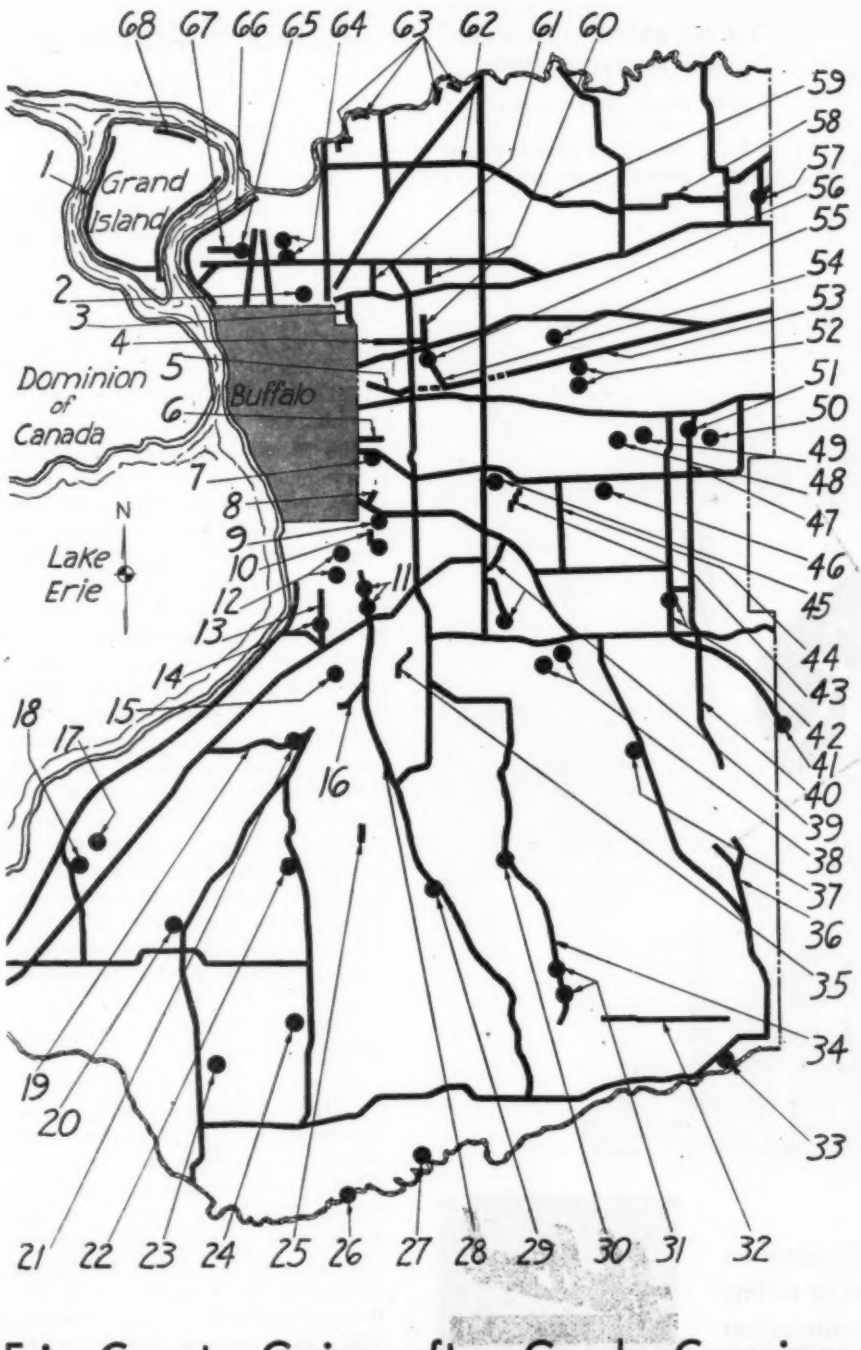

Erie County Going after Grade Crossings

OFFICIALS of Erie County (Buffalo), New York, haven't taken "can't" for an answer in their efforts to keep postwar plans preparation moving along.

This county with 1,163 miles of county highways has projected 110 miles of new construction or reconstruction in spite of having entered the war period with a fairly well-built-up system. A $11,495,000 five-year program has been laid out, involving projects to cost $2,783,000 the first postwar year and slightly larger sums yearly thereafter. About $7,575,000 of this sum will go for roadways, including small bridges and $3,920,000 for grade separations. As of May 1 final plans were ready for road projects totaling 12.98 miles of bituminous macadam and concrete construction, estimated at $1,398,000. Also one bridge at $80,000 and another nearly ready at $88,000.

Important among the projects ready is a $716,000 section of the Niagara Thruway Connection.

Engineers have been pulled in from the county's five district maintenance offices from two to five to hasten the designing job, help with tracing, etc.

The accompanying map is interesting in that it shows the widely scattered location of the program's 68 major projects. Of the 24 bridge structure projects, 14 are grade crossing eliminations, which represent one of the sorest needs of the Buffalo area. Also needed and partially provided for is the replacement of many of the 124 county road bridges listed as inadequate. Thirty of these are rated at "0-5 tons" capacity, the rest at 6-12 tons, or too narrow (less than 20 ft. wide).

About $300,000 expenditure is also contemplated for additions to maintenance garage facilities, under a plan to increase maintenance districts from the present five to ten in order to expedite emergency winter service on the Buffalo fringe and elsewhere. Arthur J. Yaw is superintendent of highways of Erie County.

Projects Shown on Map

1. 2.13 mi. 24-ft. wide, new R/W; $125,000
2. RR underpass; $320,000
3. 0.97 mi. widen to 32 ft.; $60,000
4. 1.90 mi. widen from 18 to 30 ft.; $90,000
5. 5.48 mi. 30-ft. concrete; $435,000
6. 0.87 mi. 86-ft. concrete; $90,000
7. Bridge, 250-ft. bridge widen to 40-ft.; $60,000
8. 0.50 mi. 28-ft. pvmt.; $65,000
9. Reconst. RR overhead; $175,000
10. 0.60 mi., 20-ft. road mix; $125,000
11. Relocation RR underpass; $150,000
12. Overhead (4 RR's); $750,000
13. 2.30 mi. 30-ft. const.; $260,000
14. RR overpass; $180,000
15. RR overpass; $160,000
16. 0.98 mi. 24-ft. concrete; $80,000
17. RR underpass; $350,000
18. 90-ft. truss; $40,000
19. 4.06 mi. new road const.; $210,000
20. 60-ft. girder; $40,000
21. RR overhead; $225,000
22. 250-ft: bridge; $80,000
23. 50-ft. girder; $50,000
24. 200-ft. bridge, new location; $50,000
25. 0.50 mi. 20-ft. roadway; $60,000
26. 225-ft. span; $35,000 (Erie County share)
27. 22-ft. span, new road; $30,000
28. 8.98 mi. widen to 30 ft.; $475,000
29. 92-ft. steel truss; $40,000
30. Reconst. RR overhead; $115,000
31. Two RR overheads; $275,000
32. 6.02 mi. road mix const.; $240,000
33. 175-ft. bridge $40,000 (Erie County share)
34. 5.03 mi. widen and resurf.; $295,000
35. 1.17 mi. reconst.; $60,000
36. 4.29 mi. road mix const.; $170,000
37. 70-ft. girder bridge; $40,000
38. Two bridges, 75 and 95 ft.; $100,000
39. 3.85 mi. new roadway and 150-ft. bridge; $260,000
40. 5.50 mi. road mix; $220,000
41. 100-ft. bridge; $25,000 (Erie County share)
42. 1.57 mi. plus 170-ft. bridge; $160,000
43. 1.57 mi. 20 ft. const.; $85,000
44. 5.66 mi. widen from 16 to 24 ft.; $195,000
45. 120-ft. bridge; $40,000
46. 150-ft. bridge; $80,000
47. 7.06 mi. road mix; $255,000
48. 120-ft. bridge; $50,000
49. 105-ft. bridge; $35,000
50. 80-ft. bridge; $35,000
51. 80-ft. bridge; $35,000
52. Reconst. RR overhead and new overhead; $410,000
53. 7.32 mi. 30-ft. concrete pvmt., 70-ft. bridge; $470,000
54. 1.88 mi. 22-ft. concrete, 30-ft. bridge; $135,000
55. 80-ft. bridge; $50,000
56. RR overhead; $165,000
57. 3.22 mi. widen to 22 ft., 90-ft. bridge; $155,000
58. 4.67 mi. reconst. and widen; $102,000
59. 7.02 mi. widen from 16 to 22 ft.; $165,000
60. 2.61 mi. widen and resurf. two sections; $145,000
61. 1.05 mi. widen from 18 to 30 ft.; $50,000
62. 6.72 mi. 22-ft. const.; $275,000
63. 2.00 mi., 4 relocated sections; $100,000
64. Two RR overheads; $425,000
65. RR underpass; $220,000
66. 2.30 mi. 40-ft. pvmt.; $260,000
67. 1.02 mi. 36-ft. pvmt.; $85,000
68. 2.00 mi. 20-ft. road mix; $120,000

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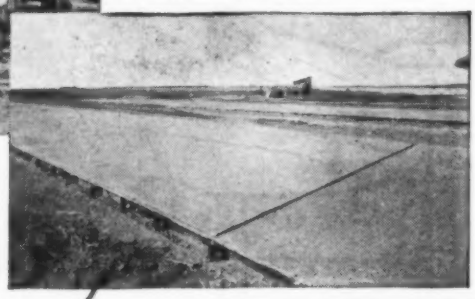

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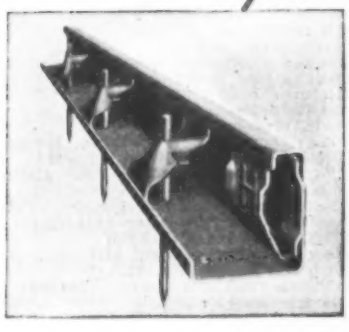

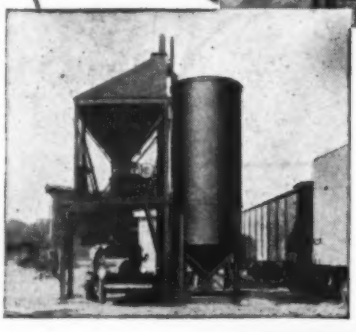

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Road Building as a Career

By CHARLES M. UPHAM
Engineer-Director
American Road Builders' Association

WHEN the war in the Pacific has been settled, we will enter upon the greatest era of highway construction that this country has ever known. A program truly astonishing in its size and extent will be carried out in the next few decades, and its effect on our national life will be far-reaching.

The increase in motor transportation is one of the reasons why we can safely prophesy a vastly augmented interest in this form of construction. Trucks, buses and private cars will be used to a far greater extent than ever before. They will be new and better vehicles, and they will require new and better roadways on which to run. More trained and experienced men must be found to build these scientific highways of tomorrow. It will be a big and colorful job, and it is recommended as a career to young men for their serious consideration.

This need for more trained road builders presents a challenge to our technical schools and universities. Highly specialized knowledge is required by the highway engineer, and special courses should be developed to offer it to young men who can visualize the bright future in this interesting profession.

Let's examine some of the things the highway engineer ought to know. Assuming a basic schooling in the principles of civil engineering, he should be acquainted with machinery, for road building today is a highly mechanized industry. He should know something of chemistry, geology, and metallurgy as it applies to his work. Because highways project themselves into the economic development of states and communities, he should have some familiarity with political economy, finance and administration. He should be able to handle efficiently men, equipment and supplies, and a smattering of commercial law won't hurt him. These are some of the things that will contribute greatly to success as a highway engineer. It is not a narrow profession by any means.

College courses should combine practical training with classroom work as a preparation for a road building career. During the Summer, the student can work on surveys or drafting or on actual construction jobs or in the plants of manufacturers or producers of construction equipment and materials. Field trips

to road projects of every type should round out his vacation experience.

Under the so-called "G. I. Bill of Rights," veterans of the World War may secure college or vocational training upon being discharged. During the war, thousands of young men learned to operate bulldozers, tractors, shovels, scrapers and many other machines used in road and airport building. Give men in khaki technical classroom training under the bill, and they will emerge as fine a lot of construction men as any highway department or highway contractor could wish.

After months and years under military discipline, the returned veteran may very likely be undecided as to what he wants to do in civilian life. Naturally he is asking—what will this or that employment offer me?

We feel that any young man with a bent for engineering will find in this specialized branch an interesting field of endeavor whose rewards and compensations are in direct ratio to his ability and energy. It will mean hard work. It will require good health and a constitution that can take it. It will require a considerable period of training. It won't be a cinch or a sinecure. But it will pay off in the gold of accomplishment and the satisfaction of contributing something tangible to our national life.

What does it offer? A job at reasonable wages and a chance for advancement. What more could anyone ask in a field so rich in opportunity?

We are hopeful that a considerable number of young men will take this suggestion for a career to heart. We hope too that heads of colleges and universities will give the matter of special road building instruction serious consideration in making up their engineering schedules for postwar years.

▼

Large Sum Needed to Develop Highway System

About $175,000,000 will be needed eventually for Washington to expand and develop its highway system, reports Clinton S. Reynolds of Tacoma, state highway commissioner. About $80,000,000 will be needed immediately after the war for improvement and modernization of present roads; the balance for new construction later.

Half of the latter sum is in sight now, with an estimated annual state highway income of $75,000,000 in the three years following the war, about $30,000,000 of which is earmarked for reconstruction work, and the rest expected to come from federal funds.

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As the reconstruction job looked when rock fill and riprap were about half completed

How a Sliding Hillside Fill Was Stabilized

By GEORGE H. SHEARER
District Engineer, Washington Department of Highways, Seattle

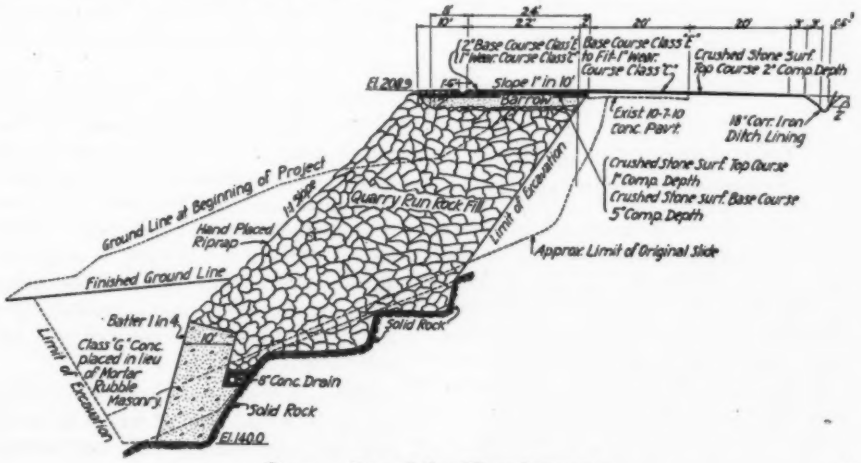
HOW a bad slippage problem on 4-lane Primary State Highway No. 2 near Seattle was corrected during 1944 is described in the following paragraphs.

The large fill involved had given us considerable trouble over the years by reason of slippage, and prior to starting this project, we laid out a grid and drilled holes to the bed rock at intervals of 25 ft. We found that the very sloping condition of the underlying rock and the presence of water over practically this entire area was the cause of fill slippage.

It was decided after considerable study that the best solution was to remove the toe of the fill, construct a bench in the rock, and place a toe fill. A toe fill of concrete was constructed at a point about 75 ft. from centerline from 50 ft. below grade, with drains back of the wall and outlets through the wall to carry out seepage water. The base of the fill behind the wall was then constructed of heavy rock, and a fill above was reconstructed of a sand and gravel material. Because of the location of the wall it was necessary to riprap the face of the fill to maintain a 1:1 slope (as shown in the accompanying photos taken by Roads and Streets editor).

Consideration was given to construction of a bridge, but this idea was discarded as there was possibility of further slippage which might injure any foundations for such a bridge. A line change was also considered, but because of the existence of summits in both directions it was felt that such a change would be objectionable and hazardous from a traffic standpoint. The fill construction finally designed was cheaper and has proven satisfactory. About 40,000 cu. yd. of excavation was involved.

We have made a complete investigation of the premises this spring and find that in spite of the very wet season, there is no indication of movement in the construction. We believe, therefore, that it is entirely satisfactory. The roadway surface was replaced with an asphaltic type of surface rather than restoring the old concrete pavement. George J. Beck was resident engineer.


2" Base Course Class 'E'
1" Wear. Course Class 'C'
Base Course Class 'E' to Fit 1" Wear. Course Class 'C'
Crushed Stone Surf. Top Course 2" Comp. Depth
Slope 1" in 10'
El. 208.9
Barrow Pit
Exist. 10-7-10 conc. Pavt.
18" Corr. Iron Ditch Lining
Crushed Stone Surf. Top Course 1" Comp. Depth
Crushed Stone surf. Base Course 5" Comp. Depth
Ground Line at Beginning of Project
Quarry Run Rock Fill
Hand Placed Riprap
Limit of Excavation
Approx. Limit of Original Slide
Finished Ground Line
Batter 1 in 4
Solid Rock
Class 'G' Conc. placed in lieu of Mortar Rubble Masonry
8" Conc. Drain
Solid Rock
El. 140.0
Limit of Excavation

Cross section of the fill replacement

Latin American Engineers to Get Special Training in U.S.

Beginning in 1946, 20 practicing Latin American engineers and construction men are to receive a year's special training in the United States, according to a plan announced by Charles M. Upham, engineer-director American Road Builders Association. Training will consist of study and practical experience with the object of familiarizing the trainees with American construction methods, equipment, materials and specifications.

The engineers must be graduates of a recognized engineering school and be between 24 and 40 years of age. The construction men must have the equivalent of a high school education, 8 years' experience and be between 28 and 40.

Trainees during the special orientation course will receive subsistence expenses from a fund set up by the American Road Builders Association and the Office of Inter-American Affairs. This will be supplemented by 8 months' practical field work in highway departments or manufacturing plants, or both, during which trainees will receive living expenses from their employees in lieu of wages.

Gravel Production Costs in Ionia County, Mich.

Like many counties in glacial-area states, Ionia County, Michigan, at one time or another has produced its own gravel for road surfacing and maintenance. According to Allan M. Williams, County Engineer, a modern portable crushing and screening plant was operated in various parts of the county for several years prior to the war, this plant having been sold recently when an advantageous purchase price was offered. The county is currently buying crushed and screened gravel from a commercial plant for 40 to 50 cents a cubic yard.

Unit cost figures for the county-owned equipment are reported as follows for the typical prewar year, 1941, including bookkeeping charge for rental against equipment replacement:

Pit No.	No. 1	No. 2	No. 3
Production (cu. yd.)	6,500	9,200	11,600
Labor	$0.131	$0.098	$0.099
Materials (gas, oil, etc.)	.058	.022	.029
Equipment rental	.326	.168	.176
Bank price of gravel	.100	.080	.100
Total per cu. yd.	$0.615	$0.368	$0.404

In 1942 a slightly different method of computing was kept on two larger pit operations, as follows:

Pit No.	No. 1	No. 2
Production (cu. yd.)	26,700	27,500
Labor	$0.1122	$0.0823
Equipment rental	.1285	.1725
Bank price	.1000	.1000
5% overhead	.0170	.0177
Total per cu. yd.	$0.3577	$0.3755

▼

Yale Announces Traffic Engineering Fellowships

Ten Graduate Fellowships in Traffic Engineering are announced by the Bureau of Highway Traffic of Yale University. These Fellowships, made possible through a grant from the Automotive Safety Foundation, amount to $1400 each and provide for an academic year beginning Oct. 1, 1945.

Yale's regular course of Graduate Training in Traffic Engineering is being resumed for the first time since Pearl Harbor. Director T. M. Matson of the Yale Bureau of Highway Traffic stated that, "The resumption of Graduate Training in Traffic Engineering is especially timely in view of the acute street and highway transportation problems which now exist and which will grow worse as travel restrictions are lifted. Matters of traffic operations are being given increased attention by state and municipal officials in the planning of roadway facilities for the postwar period. The courses offered are designed to give the student skill and ability in analyzing traffic conditions and in planning for their improvement in both rural and urban areas."

Enrollment will be limited to 35 students meeting graduate training requirements. In addition to recipients of Fellowships, the course is open to returning veterans under the provision of the G. I. Bill of Rights. It is also expected that there will be students from city engineering and state highway departments who will enroll either on their own, or with some financial support made possible through special assignment by their employers. Additional information concerning the course and Fellowships may be obtained by writing to the Bureau of Highway Traffic, Yale University, New Haven, Connecticut.

▼

$700,000,000 Airport Bill Before House

Another airport bill is now before Congress. House Resolution 3615, carrying an authorization of $700,000,000 for a 10-year program was reported favorably on June 30. Of the total, $650,000,000 is for airport development within the Continental United States and $50,000,000 for projects in territories and possessions. Funds for projects in the United States must be matched dollar for dollar while the federal government will pay 75 per cent of the cost on the other projects.

The bill directs the Administrator of Civil Aeronautics to prepare a national plan for the development of airports and authorizes the immediate appropriation of $3,000,000 for preliminary planning and surveys instant to the initiation of such a program. In addition, 5 per cent of the other authorizations are made available for necessary planning, research and administrative expenses.

The other measure now before Congress is Senate Bill 2 which is pending in the Senate. This bill carries authorizations of $500,000,000 and provides for a 5-year program. It differs from the House Bill in that it requires all funds for Class 1, 2 and 3 airports be channelled through state aviation agencies, while the House Bill makes any public agency eligible for sponsorship.

▼

Road Magnet Operates at 30 Cents a Mile

A road magnet outfit developed to Minnesota state department of highway specifications weighs 4½ tons including 1½-ton truck; works effectively at 10 mph.; picks up 5 to 10 lb. of metal (100 pieces per lb.) per mile of gravel and 1 to 2 lb. per mile of oiled on paved road; cost $3,065 to build; costs $0.30 per mile of 8-ft. swath to operate or about $1.00 per mile of roadway. These additional data are supplied by Maintenance Engineer C. L. Motl, supplementary specification details published in December, 1944, ROADS AND STREETS.

Postwar Highway Notes

Montana voters in a special election voted "yes" 5 to 1 on a $12,000,000 highway debenture issue to help finance state participation in the state's $46,000,000 three-year postwar Federal-aid program.

* * *

Louisiana officials are making no little plans! A ten-year program presented by D. Y. Smith, director of highways, calls for a $400 million dollar outlay. A partial breakdown:

New multi-lane concrete highways, $118,659,000; new 2-lane concrete highways, $95,907,000; widened multi-lane concrete highways, $57,030,000; widened 2-lane concrete highways, $34,290,000; new 2-lane asphalt highways, $43,010,000; resurfaced two-lane asphalt highways, $7,340,000; resurfaced gravel highways, $13,772,000; repaired bridges, $13,772,000.

Some 233 miles of multi-lane highways are planned, plus 1170 miles of new 2-lane concrete pavements, to translate the program partially into miles. The state has charge of maintenance of 36% of the state's total road mileage.

* * *

Speaking of boxcar figures, the figure $73,000,000 has been given as the probable cost of a proposed vehicular tunnel under the Narrows connecting Brooklyn and Staten Island, New York. As recommended by the New York City tunnel authority, it will consist of twin tubes under the Narrows here and approaches. A plan of liquidation in 40 years calls for a toll of 40 cents per passenger vehicle and $1.15 for trailer trucks, assuming a traffic volume gradually increasing from 6,000,000 to 16,000,000 vehicles annually. This project is acclaimed as a sound one and is said to have approval and to be waiting on financing, which may be public or private.

* * *

Ten mine-to-market highway projects are to be built by Washington counties with state funds paying 25% of the cost. These jobs are in furtherance of a program begun in 1939. Projects are of low type construction, ranging in length from one mile up.

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Widening and Resurfacing of Old Concrete Pavement in Oregon

Representing typical problem of salvaging old pavement; bridges moved laterally as detours

By R. H. BALDOCK
State Highway Engineer
Oregon State Highway Department, Salem

ON THE Pacific Highway East (U. S. 99E), between the towns of Halsey and Harrisburg, was a concrete pavement built as one of the first projects on the Oregon highway system. This pavement was 16 feet in width with a uniform thickness of seven inches. The pavement was built in 1921. Throughout the years the traffic had increased until the width was totally inadequate to safely serve the traffic volume. Some sections of the pavement had severely cracked under the repeated heavy loads and many of the slabs were rocking under traffic. This section of highway is an important link in the transportation system, and it was judged necessary to improve the pavement to serve the vital wartime traffic. The pavement itself, while inadequate as a roadway surface, could serve as a base for a widened and strengthened pavement.

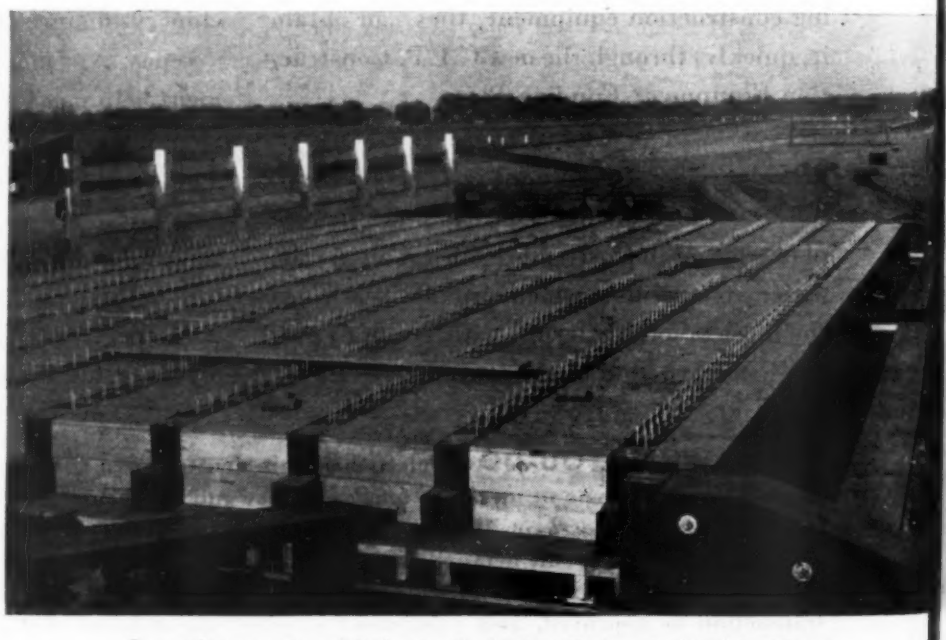
Part of Interregional System

This section of highway is on the proposed interstate system, and, in making the improvements, plans were laid for an eventual 4-lane pavement and right-of-way was secured with this in mind. Construction at this time, however, is limited to the easterly two lanes of the eventual development except for a short section through the town of Halsey.

The highway through Halsey was surfaced over the entire street width and forms a completed section of the eventual 4-lane development. There are two 24-ft. lanes of 8-in. portland cement concrete separated by a 4-ft. asphaltic concrete parting strip built flush with the adjacent pavement. (See Fig. 1) A 6 ft. asphaltic concrete parking lane on each side completes the surfacing to the concrete curbs of the sidewalk area, making a total surfaced width of 64 ft. Due to grade changes the old pavement was removed in this section and a rock base placed.

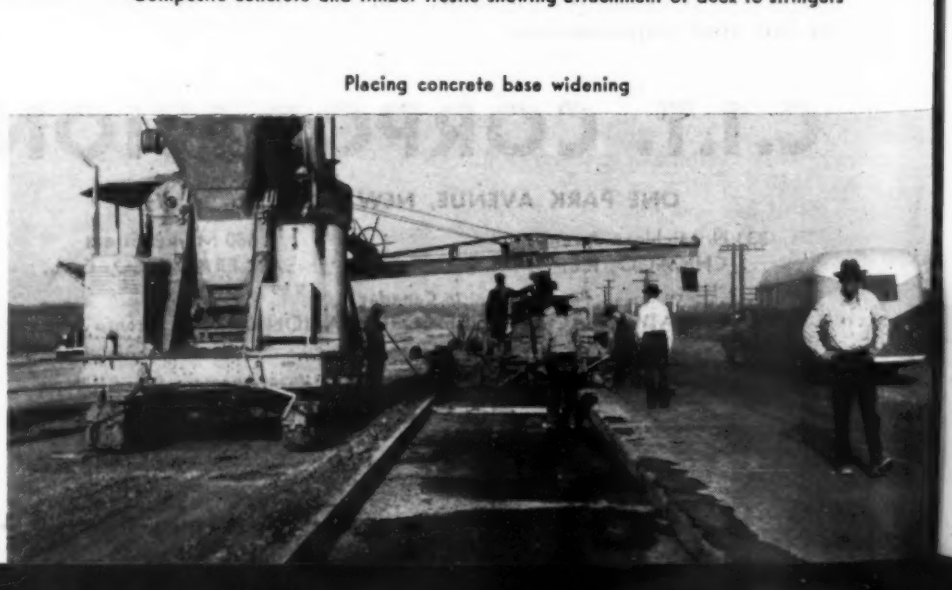
At the south end of this 4-lane section an asphaltic concrete transition section (Fig. 2) merges the four lanes into two lanes laid on the center line of the easterly two lanes of the eventual development. The northerly 3400 ft. is on new alignment and is 8-in. portland cement concrete laid on a 4-in. gravel base. (Fig. 3) Expansion joints were placed at 1000-ft. intervals with dummy joints at 15-ft. spacing. The remaining 7.5 miles follows the existing alignment and uses the old pavement as a base. The two lanes built at this time have a paved roadway width of 24 ft. with 10-ft. rock shoulders on each side. The center line of the new roadway was shifted westerly 4 ft. from the center line of the old pavement, and the existing concrete pavement was widened (Fig. 4) by laying a concrete base 8 ft. in width. The accompanying photo shows the placing of the concrete base. Because of the crown in the old pavement, the new concrete base was built slightly higher than the edge of the existing pavement. An asphaltic concrete leveling course of a class "B" mix was laid over both the old concrete pavement and the new base so that the entire width was brought to the proper crown. An asphaltic concrete wearing surface, also of class "B" mix, was placed over the leveling course. This wearing surface was 2 in.

It was necessary to carry traffic



Composite concrete and timber trestle showing attachment of deck to stringers

Placing concrete base widening



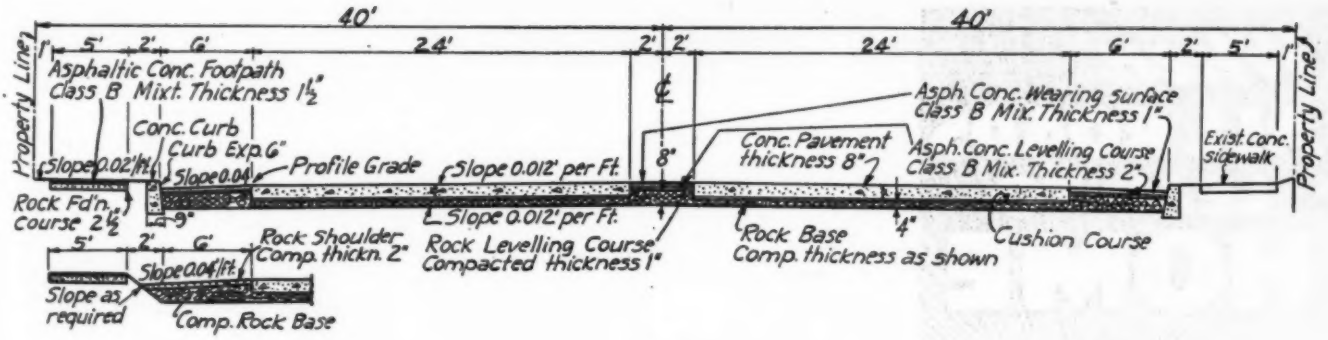


Fig. 1

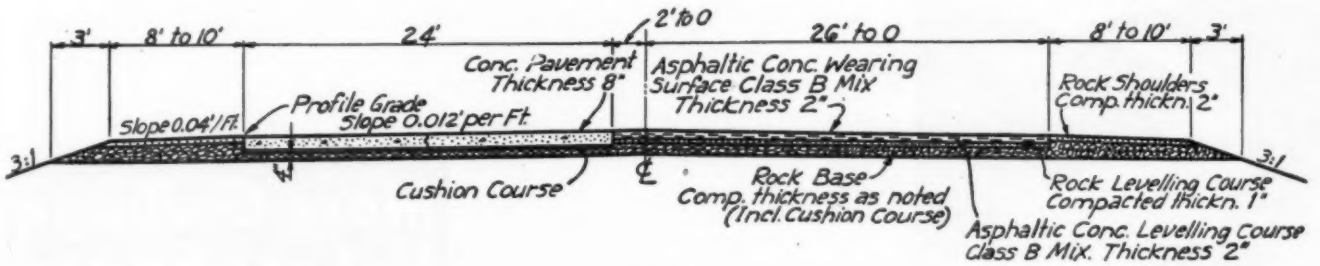


Fig. 2

over the section while construction was in progress. The first construction done consisted in the building of the 10-ft. shoulder on the easterly side of the road and surfacing this shoulder with an oil mat wearing surface having ¾ in. thickness. The shoulder and the old concrete pavement then served as a roadway during the remaining construction. Details of the section used are shown in Fig. 3.

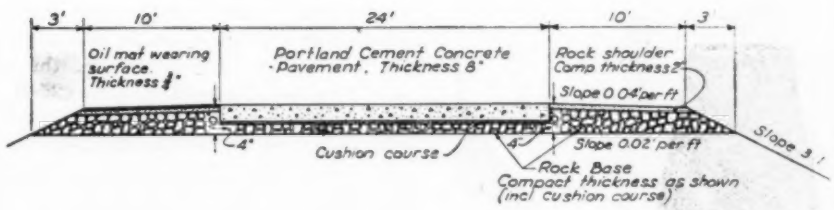


Fig. 3

It was thought probable that the rocking of the old concrete slabs would cause cracks to form in the asphaltic concrete leveling course and wearing surface. To prevent this, an extensive program of asphaltic grouting was undertaken. Two-in. holes were drilled near the end of each slab which showed a tendency to rock and hot asphalt was forced under the pavement under a pressure of about 20 lb. per sq. in. The asphalt was heated to about 350 degrees F. An asphalt with a penetration of 85-100 was used for most of the work. Some experimental joints were grouted with 60-70 penetration asphalt, and it is believed that better results can be obtained with the heavier asphalt.

No transverse joints of any kind were used in the concrete base widening. Local sand and gravel were used as aggregates and the concrete contained an average of 4½ bags of cement per cubic yard.

Timber Bridges Moved Laterally

There were four untreated timber trestles in the section which were replaced with treated timber trestles having a concrete deck and rail. In this construction the top of the stringers were prepared by daps and spikes so that a composite action of the reinforced concrete slab and the stringers is obtained. Photo shows the stringers and forms in place before the placing of the concrete deck.

An interesting feature of the project was the moving of the old timber trestles sideways to allow room for the building of the new bridges. The trestles were moved without dismantling and with a delay to traffic of not to exceed six hours. The moving was done between midnight and 6 a. m. when traffic is lightest. The first step in preparation for moving was the bolting onto the piling of four sash girts in two pairs spaced 6 in. apart. Six-in. wooden rollers were placed between these sash girts and the 6-in. section of the piles cut out flush with the edges of the sash girts. A temporary sill was laid at the elevation of the lower pair of sash girts, and the entire structure was moved sideways by block and

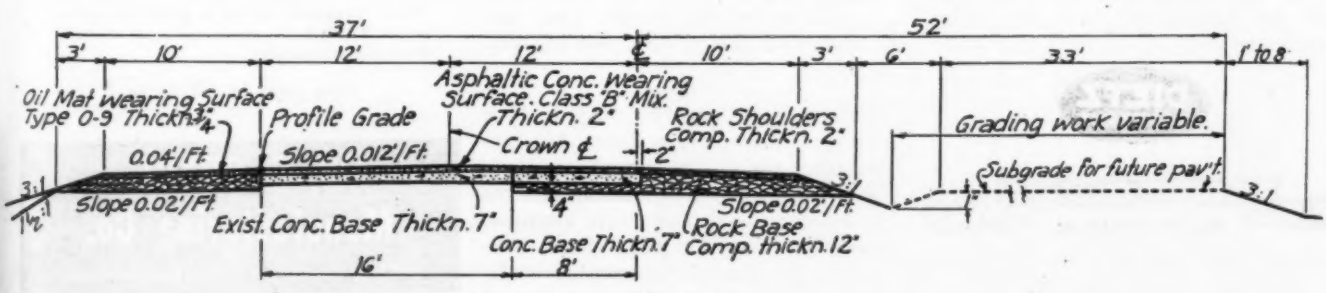


Fig. 4

An estimated expenditure of $3,000,000,000 a year, for the first FIVE post war years, will be required for repairing, extension, construction of American highways.

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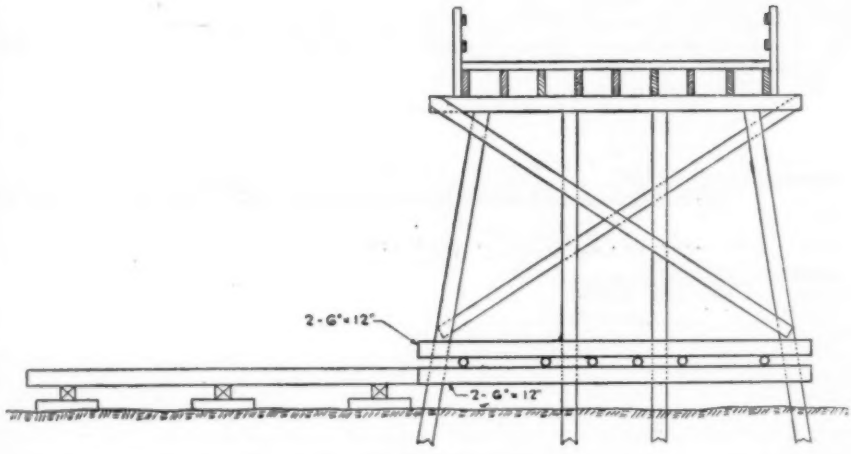

Fig. 5

tackle operated with hand winches. The unsupported length of piling above the top sash girts was stiffened with additional tower braces. This method of moving the old bridges resulted in a considerable saving in money over the construction of new detour bridges and also made unnecessary the use of a large amount of lumber so badly needed in the war effort. The longest of these four trestles consisted of seven 25-ft. spans having a total length of 175 ft. Fig. 5 shows the preparation of the pile bents before the bridges were moved.

The contract for the grading and paving work was let to Porter W. Yett of Portland, Oregon, at a total bid price of $376,000. The Frank Watt Construction Company of Portland was awarded the contract for the construction of the four trestles at a total cost of $59,000. The principal quantities were: Excavation, 77,000 cu. yd.; portland cement concrete pavement, 15,600 sq. yd.; portland cement concrete base, 36,000 sq. yd.; Class "B" asphaltic concrete, 27,000 tons; gravel in base course, 54,000 cu. yd.; creosote-treated piles, 5,900 lin. ft.; creosote-treated lumber, 160 M-F. B.M.; structural concrete, 550 cu. yd.; metal reinforcement, 118,000 lb.

The work was under the general direction of F. D. Eason, division engineer, with E. E. Umphlette as resident engineer on the grading and paving, and H. M. Teel as resident engineer on the bridges. Bob Ellis was paving superintendent for Porter Yett, and Frank Watt acted as his own superintendent.

▼

Plans for a superhighway in New Jersey, leading from Route 10, Livingston, across the proposed high-level bridge over the Passaic and the meadows to New York, were approved recently. General plans have been drawn by Marcel Villaneuva, chairman, Orange County Planning Board.

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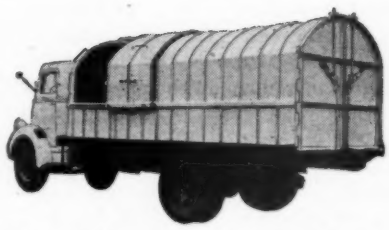

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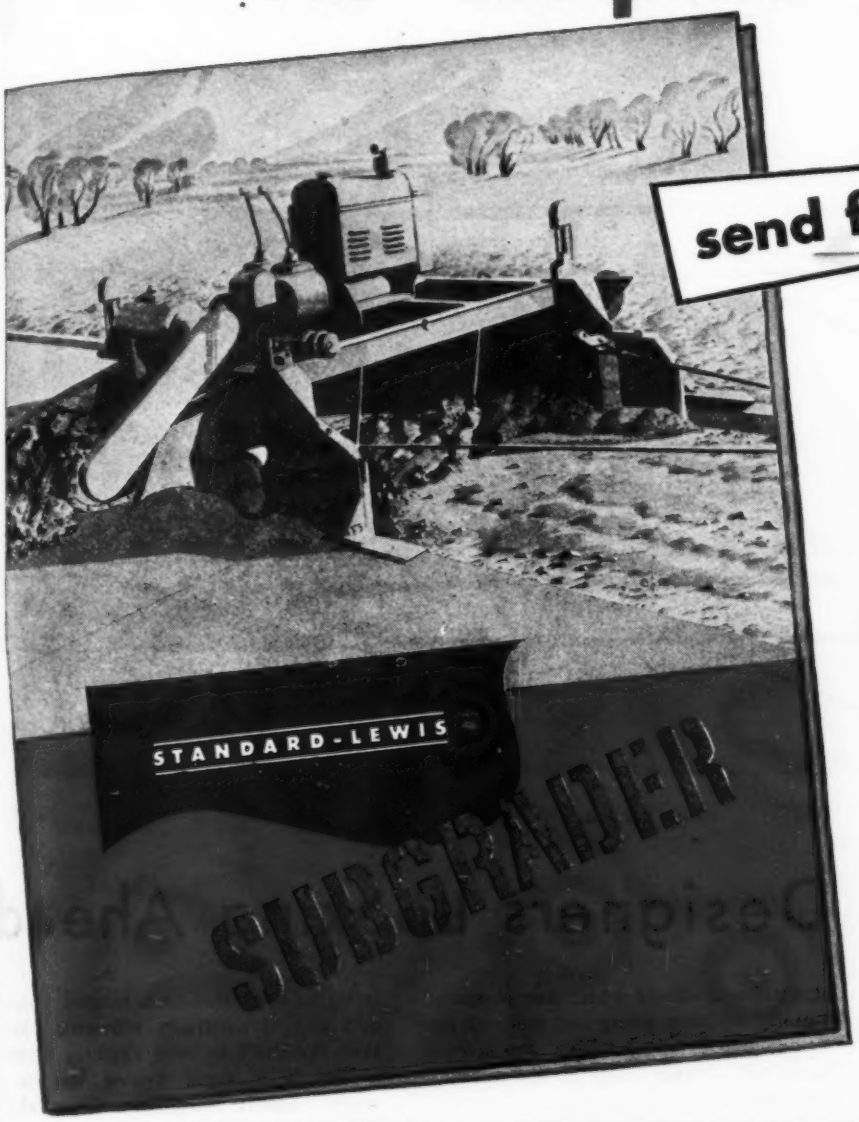

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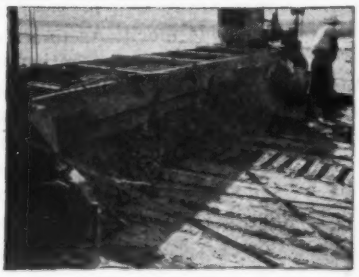

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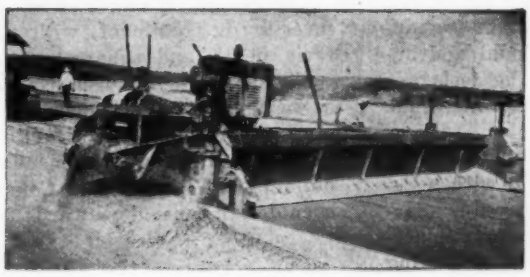

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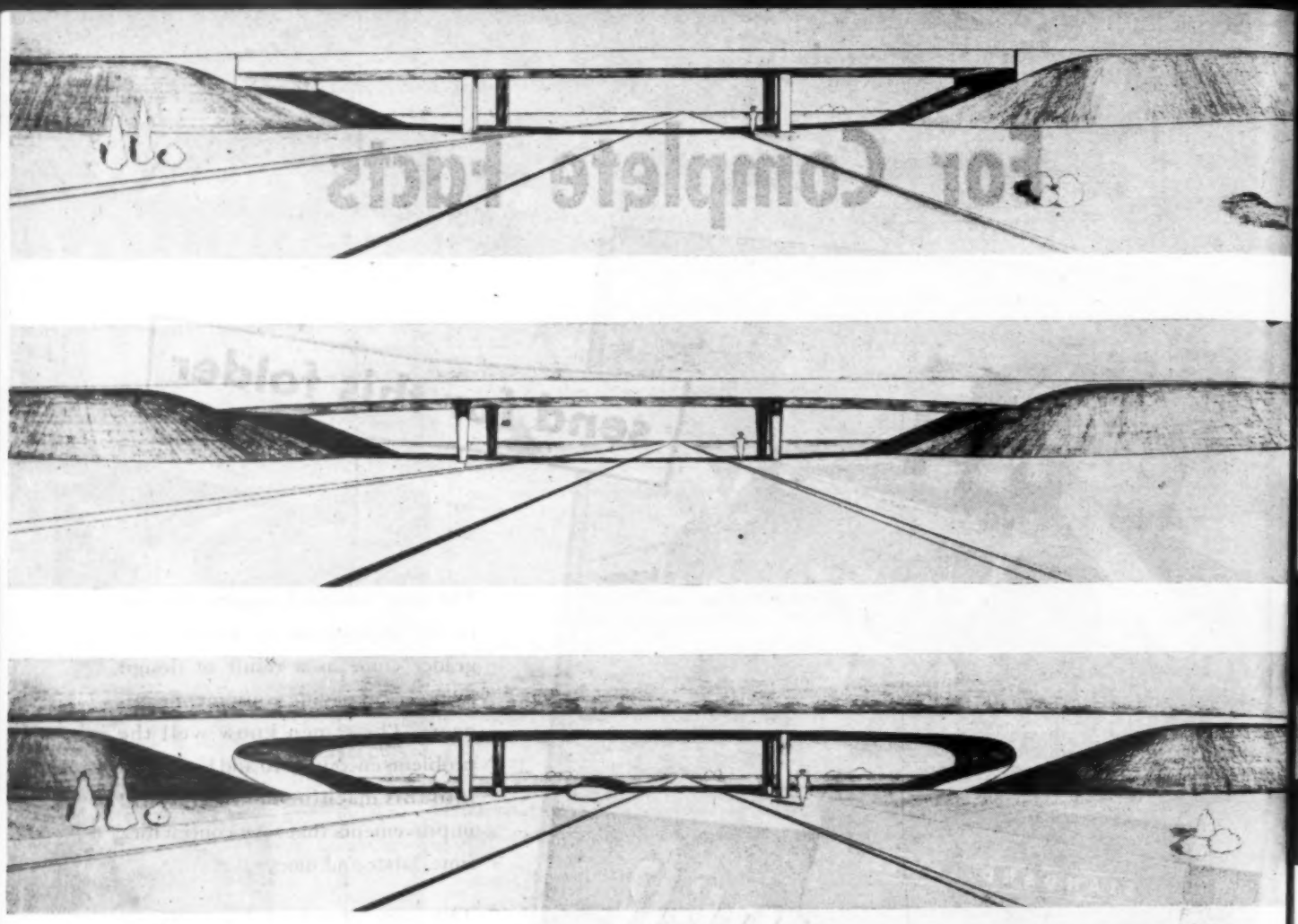


Figs. 1, 2 and 3

Texas Bridge Designers Looking Ahead

TWO young architectural engineers who "haven't anything to unlearn" about traditional bridge design practice, are at work on postwar design in the Texas Highway Department. They are helping bridge engineer James P. Exum in the development of new functional and architectural ideas, which he feels are needed today particularly in grade separation design.

These designers, while given a free hand, are working closely with a department staff that is engaged primarily in detailing structures for replacements or new projects, following Texas design standards which have long been modern and progressive.

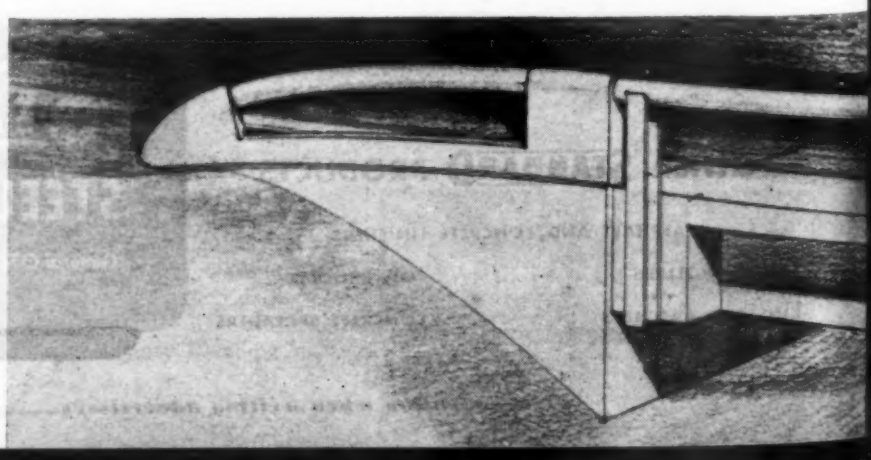
In order to study the over-all problem, perspective drawings have been made for various proposed designs showing the bridge or grade separation as the on-coming motorist would see it from the approach roadway, and also from below if a grade separation. Table models are made of more likely designs and these are photographed and studied from all angles. The aim in design is simplicity. Preliminary designs such as Figs. 1, 2 and 3, show streamlined effects which are pleasing usually without being too consciously "modernistic," and which are architecturally, structurally and functionally sound.

The design in Fig. 1 shows utmost severity of treatment, with uniform facia depth and square columns.

Fig. 2 shows a novel use (as far as bridges go) of "mushroom" columns, employed in Frank Lloyd Wright's famous Johnson Wax Co. building and elsewhere. Columns of such design taper downwards from an integral deck slab to a hinged footing and are structurally efficient. Note that the deck is very slightly arched.

Fig. 3, a rigid frame, depicts a more radical design but one which upon study will be seen to have considerable merit. As in Fig. 1 and Fig. 2, deck joints are entirely eliminated. An integral slope pavement provided under the bridge is in place of the seperate slope paving or stabilization that must usually be placed because sod won't survive. While the structural engineer may worry over stresses and

Fig. 4



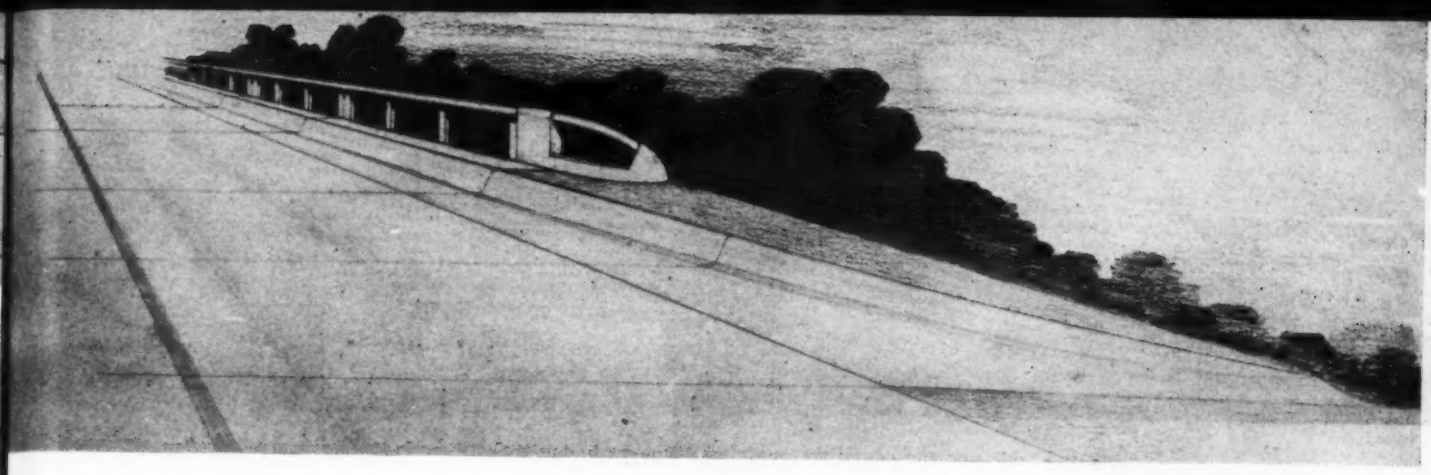


Fig. 5

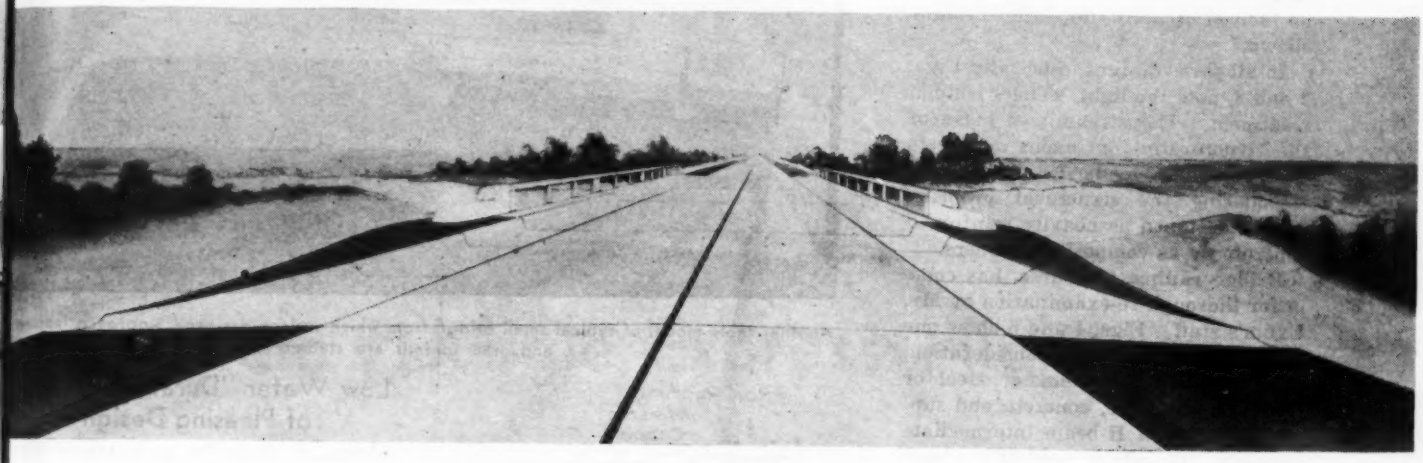
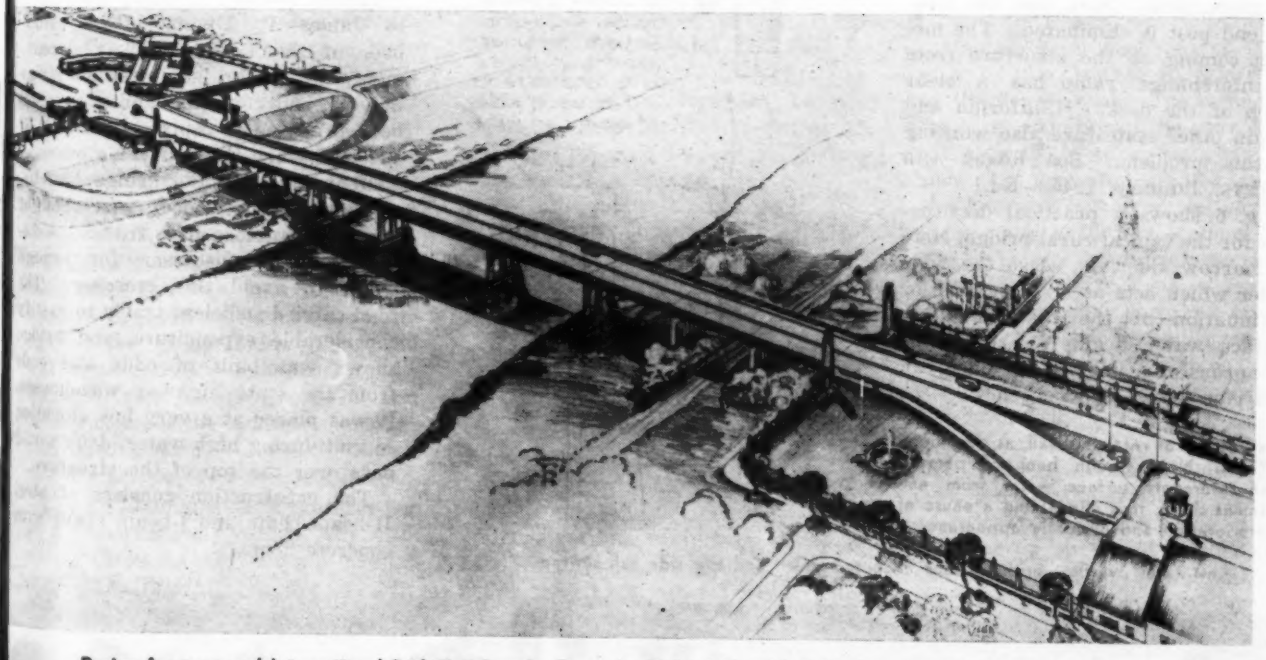
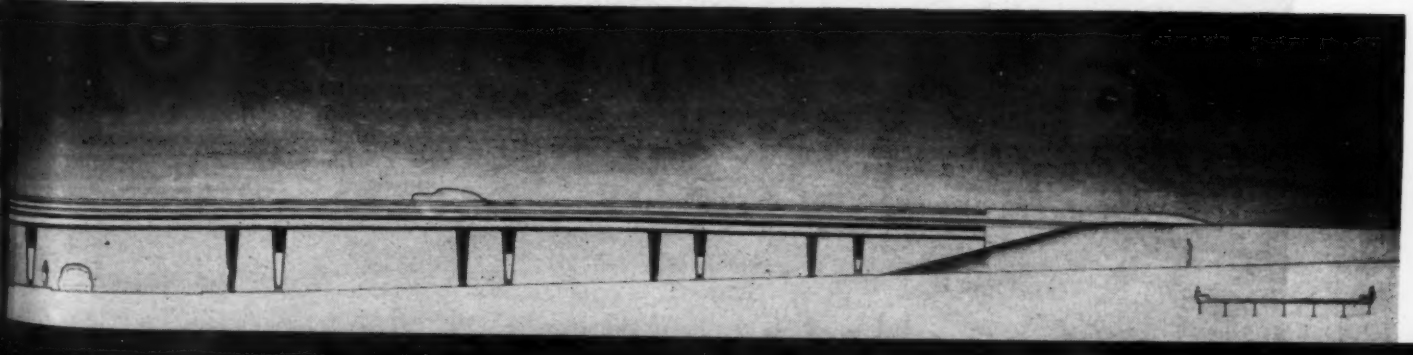


Fig. 6



Design for proposed International Bridge at Laredo, Texas, by Richard N. Wakefield, Consulting Architectural Engineer

Study of grade separation structure on interstate highway through Houston, Texas. By R. T. Martin



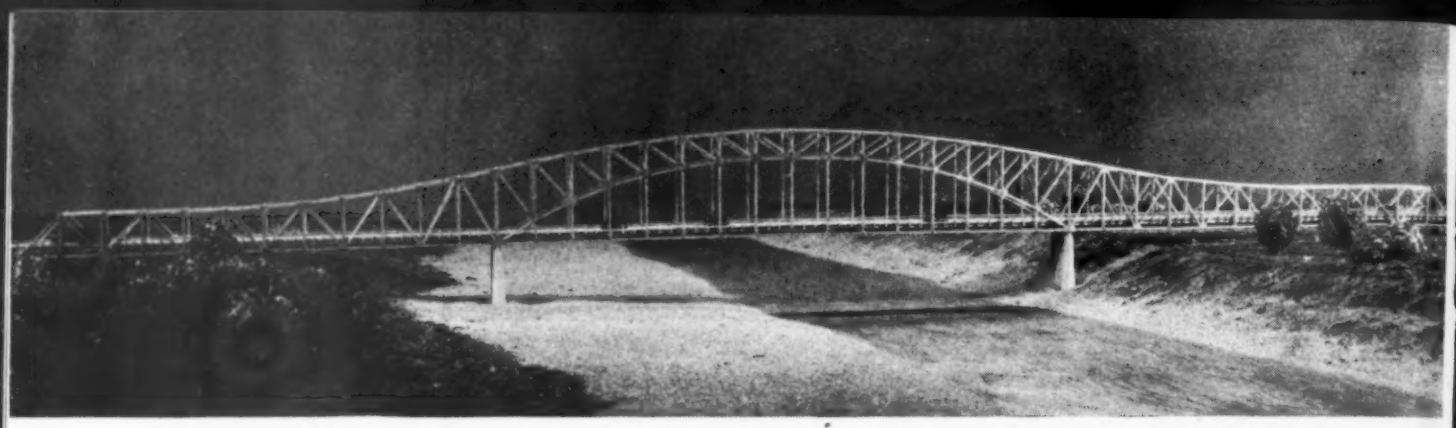


Photo of a table model of one of the many Texas highway bridge projects now in the practical design stage

detailing problems involved in this design, it is believed these problems can be solved readily for the designs shown.

In all three designs, especially Figs. 2 and 3, note the light, slender column treatment. The streamlined mass of the structurally continuous deck gets the play. The slender columns, again considering the structural problem, can be designed as heavily reinforced concrete or as composite members.

Bridge railing, of course, has come in for thorough re-examination by Mr. Exum's staff. Figs. 4 and 5 show one of several designs under consideration. Combining a large-diameter steel or wrought iron pipe, concrete end supports, and steel H-beam intermediate supports, it offers visibility, light weight, lateral strength—and pleasing appearance. Note that the massive end post is eliminated. The motorist coming on the structure from an interchange ramp has a clear sweep of the deck. [California and certain other states are also working on this problem. See ROADS AND STREETS, January, 1945.—Ed.]

Fig. 6 shows a practical deck design for the typical rural bridge. Note the narrow sidewalk. Also the wide gutter which acts as a safety zone or continuation of the road shoulder. Surface water drains to run-downs via aprons of a flat design which can be driven across in emergency.

*

Detail of top of retaining wall, as developed in Texas. Note trough back of parapet which intercepts surface water from embankment slope, thus eliminating a cause of deterioration and unsightly appearance

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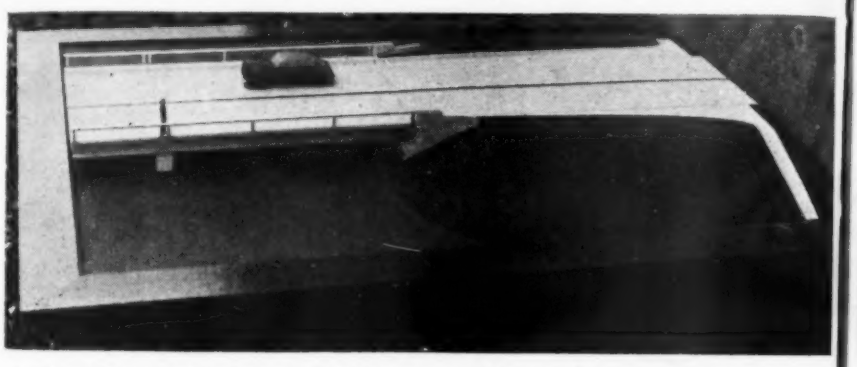
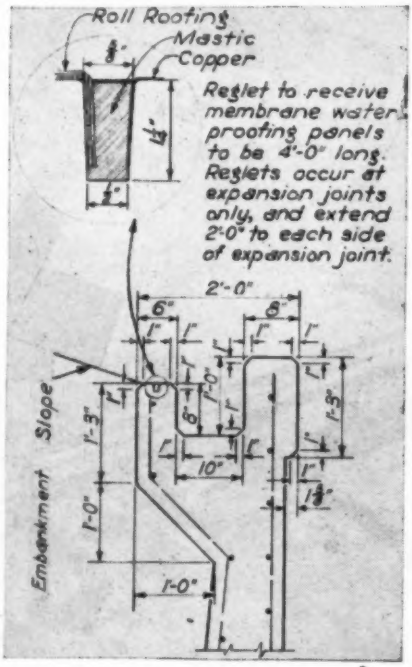


Another table model of typical small bridge from which surface drainage, approach features and other details are studied



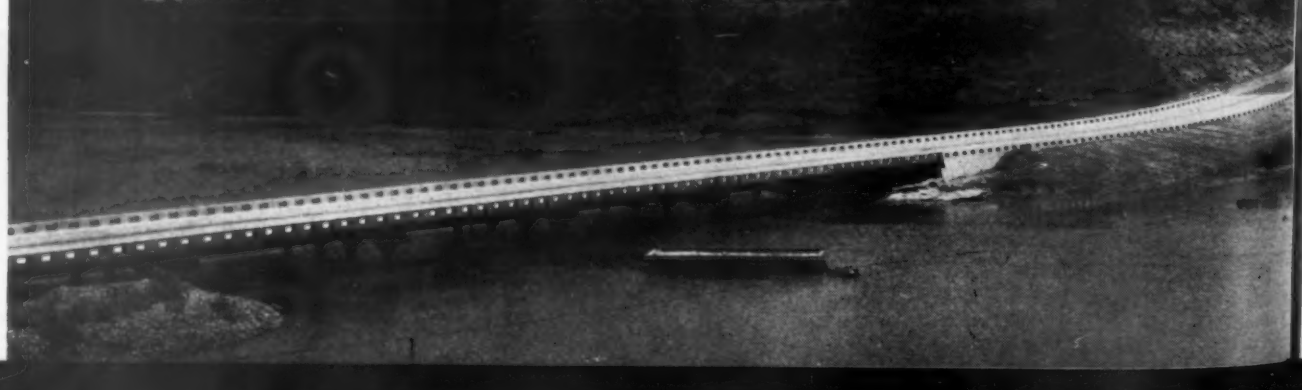
Low-water overflow bridge—deck anchored down and low side rail slotted.

Low Water "Duration" Bridge of Pleasing Design

Pictured here is a wartime low-water bridge over the Colorado River, Colorado County, Texas. According to James P. Exum, bridge engineer of the Texas highway department, the old bridge it replaces was in very bad condition and plans had been prepared to replace it at cost of $340,000 when the war came on.

Meanwhile, the old bridge had become so dilapidated it was thought advisable to close it to traffic. A 14-mile detour was necessary for through traffic to avoid this crossing. The road carried sufficient traffic to justify considerable expenditure, and bridge shown was built of odds and ends from the state highway warehouses. It was placed at a very low elevation so that during high water, drift would pass over the top of the structure.

The construction consists of steel H-beam bents and I-beam spans with concrete floor.



Seabees use a compressor and jackhammers to blast a ditch section on one side of the highway

Guam's Jungle Express Highway

THROUGH terrain so rugged they have to hold the pioneer bulldozers up on the mountainsides with steel cables, Seabees are carving a 1945-model express highway through the jungles of Guam. It is a 4-lane, high-gear highway with V-type ditch lines, long radius superelevated curve sections, and its construction represents one of the first large-scale uses of Guam coral, a roadbuilder's dream material.

Long after the Seabees have gone home after this war, the cut lines and massive fills will still stand out white against the green jungle. This road will be an enduring monument to the builders, who have moved in and quietly changed the landscape so much that aged Charmorros fail to recognize the scenes of their early life.

The 4½-mile section is the first leg of a superhighway which will ultimately link Agana, Guam's capital city, with Talafofo Village on the south side of the island. The road is being built primarily to speed the moving of supplies, and it has other strategic advantages.

The job involves rough excavation of 300,000 cu. yd. of coral and coral rock, construction of a pile-bent, laminated-timber-decked bridge, and placing of hundreds of feet of corrugated metal pipe culverts ranging 18 to 36 in. to handle the tropical rainfall. Ordinarily, 60 in. of rain falls in the six wet months.

Terrain as rough and treacherous as anything the Seabees have run up against in this part of the world, was the chief problem. The road represents a straightening of the old 20-foot trail. So tortuous was this old road that at least 65% of the new route is new construction in new territory. This fact was turned to advantage by the Seabees in routing 2000 vehicles a day past the job.

Jungle Trees You Never Heard Of

Every foot of the new construction was covered with matted, tangled jungle growth: ifil, banyan, coconut palm and nutmeg trees with plenty of guava, tangantagan and mangli bushes. Occasionally a big breadfruit tree reared up against the sky, anchored so solidly that it had to be chopped down and the roots blasted out by explosives. Before any kind of construction equipment could be brought into these places, clearing crews with axes, machetes and bolos cut a path to start. Heavy diesel tractors with angledozers did all the necessary pioneering work as soon as they could get in, working their way up the slopes.

Some of the most dangerous, spectacular mountainside clearing most of the men ever attempted was tackled by the Seabees. In numerous cases cuts were so steep that circular trails had to be cut to get the first bulldozer up to the top of the hill. Hydraulically operated angledozer blades, with a cable-filled power control unit on the back end of the tractor, were used for this work.

Tricky Dozer Work

One machine, anchored at the top of a hillside, hooked its winch cable to the drawbar pin of a second bulldozer. As calmly as if he were driving his automobile to a Saturday night show, the operator of this machine put her nose out over the edge and down many a 70-degree slope. Using his hydraulic down pressure on the dozer blade to pick up a load and slow the machine down as much as possible, the operator made pass after pass down the steep slopes, sometimes running off a straight up-and-down ledge.

No machines were lost, nor were any Seabee personnel injured, however. Part of the credit for this must go to the skill of the rear-end winch operator up on top of the mountain, and part should go to the makers of the wire rope which stood abrasion, bending strain and straight lifting loads so successfully without breaking.

All cable controlled machines were equipped with preformed wire rope. This type gave long, dependable service, and well it did, what with dozer operators thus slipping their 16-ton machines down mountainsides while hanging on a ⅝-in. winch line steel cable.

On this job 6x19 improved plow steel rope with an independent wire rope center, preformed construction,

(Upper left): Tractor and scraper excavating in shallow cut section. (Lower left): Motor grader dresses a completed fill. After exposure to traffic for a few weeks, it was surfaced. (Right): Bulldozers starting a steep cut from mountain top

was used with minimum crushing and spooling failures.

Clearing Made Fast Time

Hillside trees and brush cleared by the dozers was pushed off at the toe of the slope, usually in a ditch or ravine typical of this terrain. Not until all this clearing was done was any pioneer road construction attempted. Working two tractors, one on the slope and one above with the winch, the Seabees reached the point where they could clear 3½ to 5 acres in 8 hours' work. The clearing job was so dangerous that it was carried on only during daylight hours when everyone could see exactly what was going on. Unfortunately, when the job was covered, all this spectacular clearing was completed and it was impossible to photograph the machines in their precarious positions.

Angledozers, working downhill generally, followed the surveyor's slope stakes to gouge a pioneer path from the top to the bottom of all the steep excavations. The road thus pioneered was sloped slightly in to the side of the hill for safety, and was dug out wide enough to accommodate scrapers and rooters, or air compressors where the rock was too hard. Once the pioneer road was made, roadbuilding resolved itself into a problem of getting the most out of each piece of machinery on straight cut and fill sections.

Tractor equipment pushes a fill across a canyon. Note corrugated culvert to carry rainwater runoff through the fill

Almost all the excavated material was Mariannas Islands coral, a roadbuilding material superior to anything any of the Seabees have ever seen anywhere. It is a dense, white calcareous formation, resembling in texture and weight certain deposits of diaspor fire clay in Missouri and Arkansas. Here the similarity stops, because Guam coral will not slake down under action of air and water. It will crush under a moderately ballasted sheepsfoot roller, and will load readily into tractor-drawn scrapers after being rooted. A power shovel dipper with sharp teeth will dig it; as a matter of fact, three shovels with trucks were used here.

The advantage of the coral in roadbuilding work seems to be a unique ability of this material to make a good highway under almost any conditions. The absence of laboratory control and water wagons and the presence of a host of embryo engineers with brand new textbooks, makes no difference to this road material. It wears well, settles soon under light or heavy compaction to an ultimate density, and smooths out beautifully under a motor grader.

The Seabees doing this work are road wise, and the above paragraph does not mean that construction is careless. It is far from that. All methods, machines and design are first class. Natural "know-how,"

(*Continued on page* 112)

Equipment Maintenance

Traveling Machine Shop: Interior of converted passenger bus as seen from the rear end. A lathe occupies most of the right wall space, a tool bench the left

Machine Shop in a Bus

. . . part of A. Guthrie & Co.'s mobile field repair and servicing outfit, which also includes a "jeep" grease wagon that isn't afraid of mud, sand or rough ground

ON FIRST sight it looks like an old white bus. It is one, begolly. But gone are the seats and luggage racks. Instead a full-fledged machine shop is packed into the surprisingly spacious body, and many a broken down tractor has gone back to work in a matter of hours instead of days because this outfit was parked nearby.

This traveling unit is part of quite a fleet of mobile shop equipment on which A. Guthrie & Co., Inc., well-known contractors of St. Paul, Minn., has depended heavily to keep its earthmoving and heavy construction jobs humming. As seen in this company's 8-mile clearing, grading and drainage project for the new North Belt Line highway near Minneapolis, the individual units are described briefly as follows (see also the accompanying photos):

Machine Shop. According to grading superintendent "Herb" Griffis, the idea of utilizing a bus for this purpose occurred when a bus went over an embankment near the scene of a railroad tunnel the company was driving in Montana. The firm bought it and rigged it up to serve that job, and it has since been used on varied jobs. Along one wall inside is a large turning lathe with built-in electric motor drive. Three to four feet of open space is left at each end. Opposite the lathe, along the other side,

A. Guthrie & Co. "Limited": Travels along with the job and its shop equipment has speeded repairs of many a breakdown

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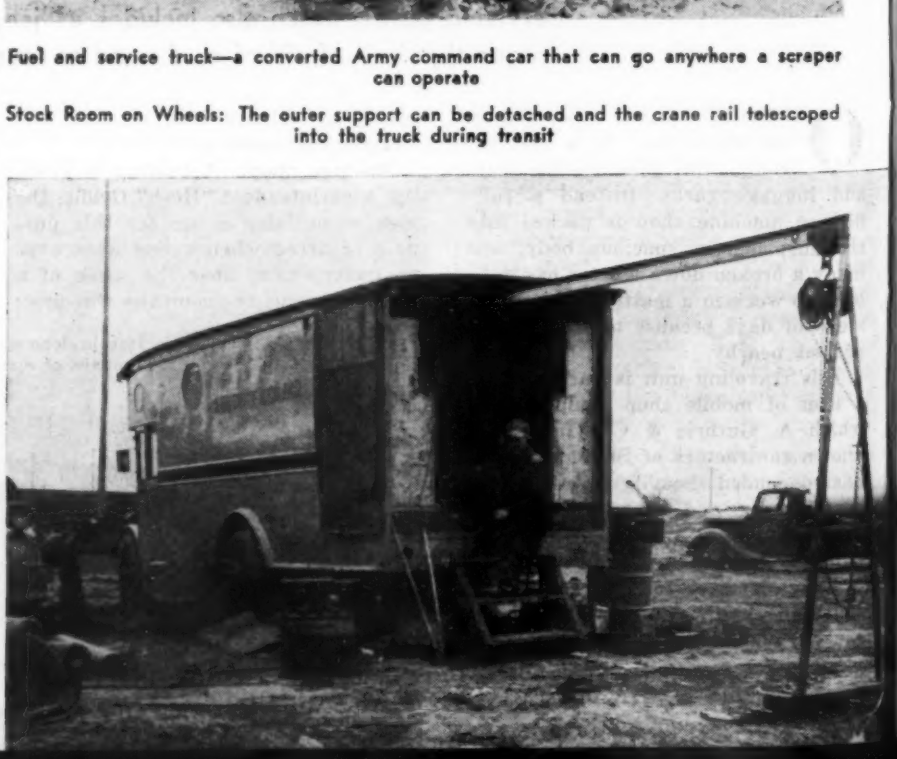
These views give an idea of the bin arrangement. A padlocked cabinet sets along the end wall inside for storing more valuable parts

Fuel and service truck—a converted Army command car that can go anywhere a scraper can operate

Stock Room on Wheels: The outer support can be detached and the crane rail telescoped into the truck during transit



is a general-purpose bench. A modern high speed drill with assorted bits and accessories is anchored to the bench. Other bench equipment includes a hand-held electric grinder, miscellaneous small tools and a heavy vise.

A bolt bin and cans of cutting oil are located under the bench, and bins for a large supply of welding and hardening rod are located across the back end, next to an electric light plant and heavy battery case. Large ceiling lights are installed for night operation. Electric power for driving equipment is taken from portable generating plants owned by contractor.

The shop is stationed at one point for the duration of a project or moved along from day to day along with other equipment, depending on the length of the project and its organization.

Warehouse Truck. This is the unit pictured with the "clothes line" extending to the rear. The truck itself is a dual-tired 5-ton furniture van that has seen its best days. The Guthrie staff apparently plotted the floor plan and interior wall space on the drafting board and designed a set of stock room bins and drawers that would make every cubic inch count. Bin space was apportioned out to hold a carefully made up list of smaller replacement parts and hardware most frequently needed for this firm's more common makes and models of earth moving equipment.

Open bins occupy side wall space as shown. A padlocked cabinet of bins and drawers is built along the front end wall back of the driver's seat, for more valuable or "stealable" items.

Note also that plenty of floor area was left as working space and to allow room to carry along large or bulky parts. Heavy castings or even complete truck motors or transmissions can be moved in or out through the rear door by means of the "collapsible" hoist rail and 4-part chain hoist. This rail, by the way, folds neatly away. The rail can be slid into the truck along a groove-way in the ceiling, and the weather-tight door closed for transit.

Oil and Grease Supply Truck. A heavy-duty unit, designed mainly to be parked near the work and to serve in cooperation with a lighter, more mobile unit, this truck is a 2½-ton job with a closed body of ample capacity. It carries an air compressor and greasing outfit and hence can give direct service on trucks or other equipment that come to it. Also carried is a 550-gal. auxiliary diesel fuel supply tank.

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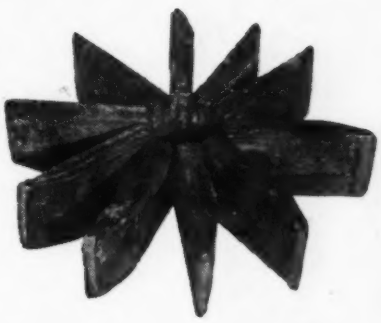

Shovel digger teeth wear rapidly. Particularly in rocky soil and gravel where they are subjected to excessive abrasion, shock and impact.

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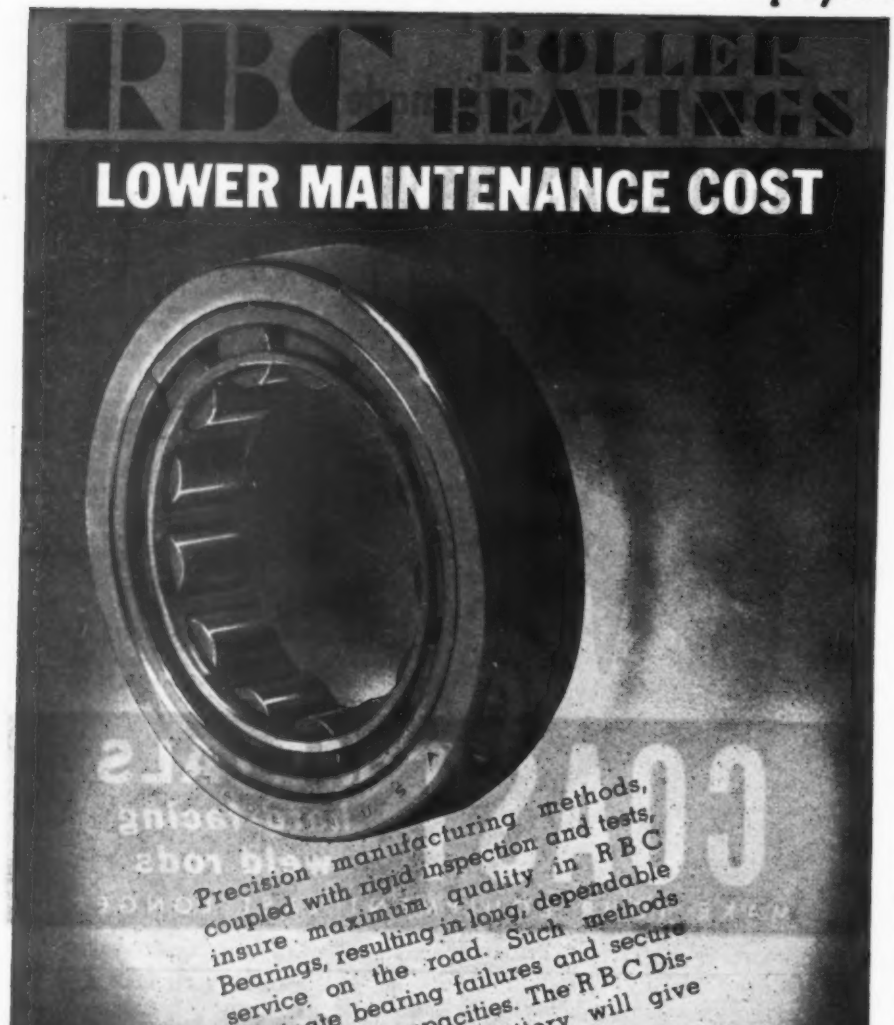
Oil and Fuel Storage Truck: This outfit it stationed near the job. It carries 500 gal. of diesel fuel, lubricating oil drums, compresser and grease lines

Looking toward the rear of the bus—note welding rod bins, and modern drilling outfit on the bench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Service "Jeep": Guthrie's field service truck is this "jeep"—a converted Army command car with 4-wheel drive and big tires that take it over soft or rough ground

Service "Jeep". This unit really isn't a "jeep" as the men on the job refer to it, but a surplus Army command car—or all-wheel-drive Dodge that can really climb over rough or soft ground and follow a scraper outfit anywhere. A rectangular diesel fuel tank holding 500 gallons completely fills the back seat space. Fuel and crank case oil supply is its main use, although the driver carries light emergency tools and a grease gun and uses the machine as a delivery car for all manner of light parts, which are thrown into the trunk compartment.

In Conclusion. The repair and servicing routine on a Guthrie job differs little from that seen on any well run job. The policy is to pull tractors out of line for servicing at any time, as needed to follow the greasing instruction charts to the letter. As much refueling and greasing as possible is done during meal stops, at which time the equipment is pulled up into two parallel lines.

Of course A. Guthrie & Co., Inc., has a headquarters shop and it also utilizes the service facilities of its equipment distributors. But when a machine breaks down in the field, the mechanics are right on it in a minute. The complete equipment and mobility of the traveling units described above have saved many hundreds of hours of down time on this firm's earth and rock jobs.

Several War-Time "Kinks"

By CARROLL BROWN
Brown Construction Co., Pueblo, Colorado

(Mr. Carroll Brown is a partner in management and operation with his brother, Clarence Brown, and the firm is known as the Brown Construction Company. Their former headquarters, for 14 years, was at Albuquerque, New Mexico. Three years ago they moved to Colorado, and established their warehouse and main office at Pueblo. The bulk of the firm's work the past few years has been on Government contract — airports, camp sites, etc.)

WE OPERATE with a five-man repair and machine shop. The last three or four years we have been doing all of our own rebuilding, and because of necessity have adopted a strict maintenance program which has done more than keep our equipment in operation. It has taught us a whole bag full of war-time "kinks" that are giving us better operation, longer life for equipment, and more output per hour per machine.

For instance, the conveyors which

we use came equipped with chains. These chains kept breaking. We had frequent trouble getting replacements. We decided to change to wire rope. This required only minor adjustments. We selected the preformed type of rope because it doesn't kink and we found it gives better, longer service with breakage troubles eliminated.

Prior to the war we often used over-sized rope to insure against breakage. Recently we have been using only the recommended size and find that we do not have as many breakdowns with the recommended size of rope as we did with oversized. I believe too many contractors try to save money by using oversized rope when in reality all they are doing is damaging their equipment and getting *less* rope service than they would get with the recommended size.

Uses Hard Facing

Another war-time "kink" which has resulted in giving us up to ten times longer life for equipment has been our recent policy of building up elevator discs. Most shop welders know about various alloys for developing harder and longer lasting edges. We have been welding new surfaces on outside, ⅝ in. wide and in no case over 1/16 in. thick. It has been our experience that the thinner the built-up surface the better. These resurfaced discs are giving us conservatively seven times the wear which a new disc will give.

Our yard is full of equipment which has been given this priority-emergency "face lifting," not only to discs but gears, sheave grooves, safety guards. More than this, where needed new machines were not to be had, we have built complete machines from parts of discarded equipment. Today they are giving us good service.

Home-Made Crusher

Our list of shop-made equipment includes a rock crusher made entirely

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OTC PUSH-PULLER removing rear wheel spindle on the Diesel No. 12 Motor Grader by pushing it through bearing. Savings in costly parts, labor and "lay-up" time on jobs soon pay for OTC TOOLS.

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No. PE-15 Maintenance Set for track type tractors, Diesel motors, road maintainers, power shovels, drag lines, etc. 2 GRIPOMATIC PULLERS (20 and 9-ton capacities), PUSH-PULLER with extra 22¼" and 16½" legs, Pulling Attachments, Heavy Duty BOX WRENCHES and 24" Tubular Handle.

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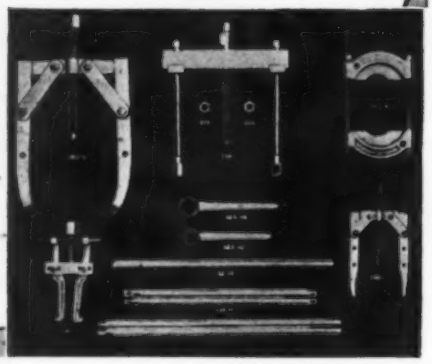


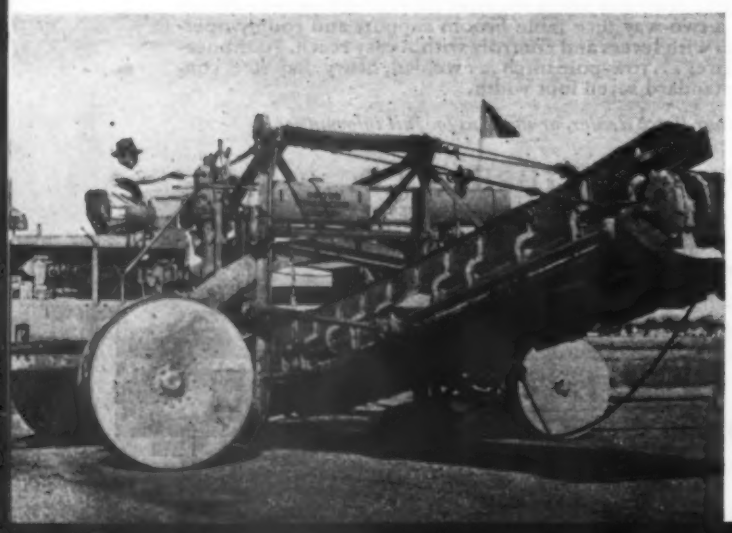
from parts of discarded machines; an air compressor assembled from parts found around the lot, powered by an old engine and mounted on old axles and wheels taken from the junk pile; and a power shovel put together from parts of old shovels. This rebuilt shovel is giving a splendid account of itself.

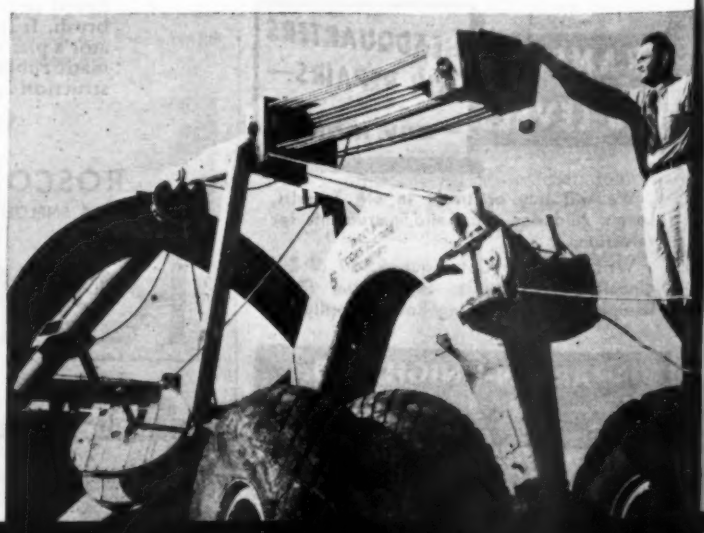
Shop-made Water Valves

A year ago we were faced with a shut-down because we could not replace three water valves. Our shop foreman devised a substitute by using a ball of rubber on a shop-made seat. We have been reproducing this trick ever since and today, a plague of valves going bad would present no operation worry. We'd simply make new ones in our shop.

When the war is over—what will these emergency "kinks" mean? It is my guess that a great many of them will take the form of permanent equipment improvements. For example, I believe we will see harder edged discs, sheave grooves which favor the wire rope standardization on preformed rope. Priorities of the past three years have compelled thousands of repair shop foremen, the country over, to make what they had last for the duration. They've come through with what it took. Their permanent contribution will be better equipment, safer methods, more economical operation for years to come.

Certainly the war experience has proved to the contractor the value of a central repair and machine shop and on-the-job repair and maintenance crews.





(Right): A 4-ton caterpillar elevating grader originally equipped with chains. With few adjustments, machine was equipped with preformed rope. Photo taken at Pueblo Municipal Airport where Brown Construction units worked recently. (Left): Superintendent Graham inspecting preformed wire cable. When a new rope is put on it is welded to the old one and allowed to run through. It has been found that this saves considerable time and guarantees a correct job of threading

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SAME SIGNS 18" X 24" TAKEN AT 600 FEET

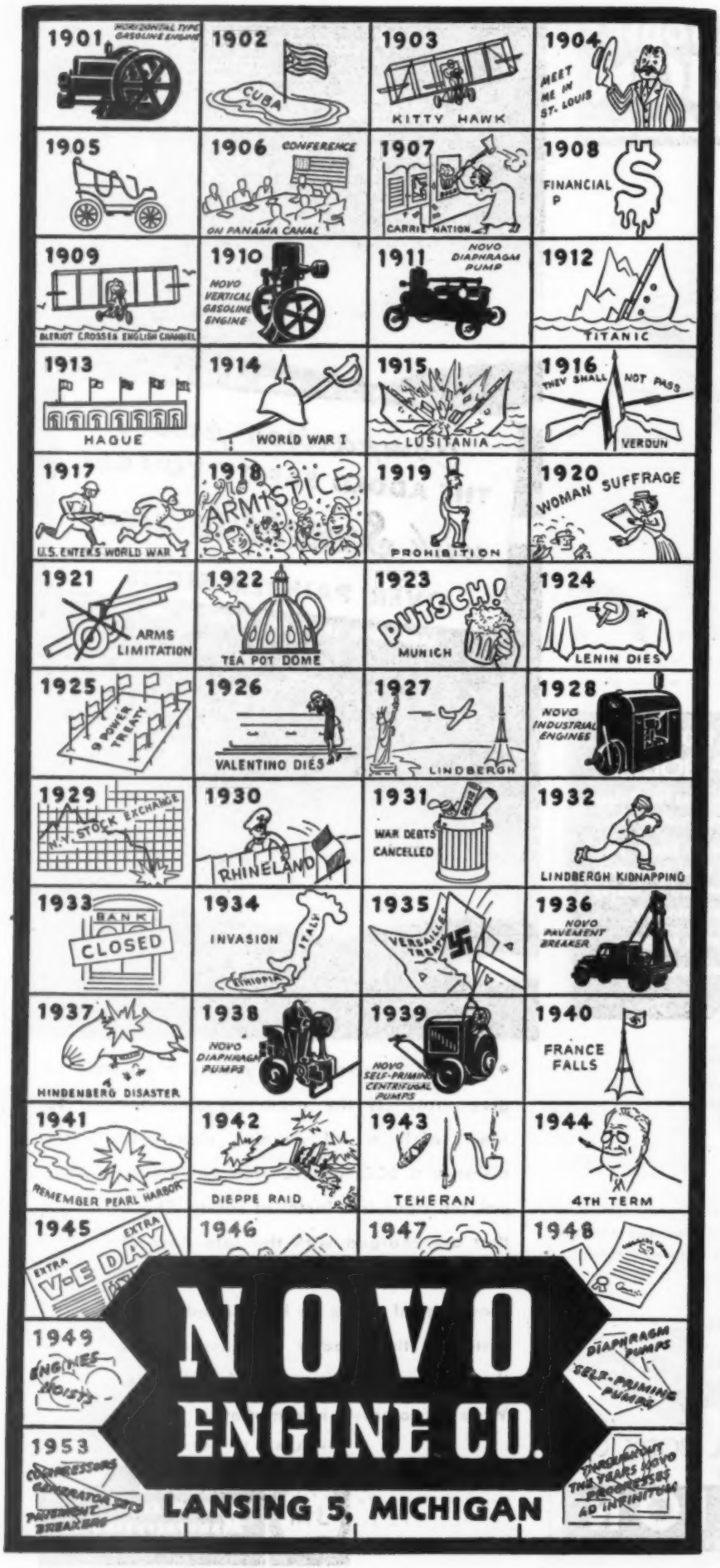
● Over-all reflectorization makes it possible to give motorists the necessary time needed to react safely to all warning signs. The extra distance a SCOTCHLITE sign can be read over pai ted signs is a factor of safety. Those that are charged with the safe flow of traffic can depend on this marking as the most logical to use for high speed travel. Installing them today will insure signs that are correct for tomorrow's demands. Write for complete information.

AVAILABLE IN ROLL FORM

MADE AND PATENTED IN U.S.A. BY

3-M

MINNESOTA MINING AND MANUFACTURING CO.
GENERAL OFFICES: SAINT PAUL 6, MINN.
BRANCHES IN PRINCIPAL CITIES



(*Continued from page* 104)

gained from years in civil and military life, makes this coral an ideal material to work by rule of thumb.

Except for one 12,000 cu. yd. cut, all cut and fill quantities were well balanced. The big cut was filled with the only loam and clay in the job, and it was hauled by tractor-drawn scrapers to a disposal area 450 ft. away.

In a few places blasting has been necessary. Three compressors with a dozen jackhammers are used to drill holes to grade, on centers decided upon in the field. One half pound of 60% gelatin per cu. yd. thoroughly shatters coral rock formations.

Equipment Data

Hauls are generally figured for 1200 feet for both tractor-drawn equipment and trucks; trucks being used only where the excavation of a deep cut by power shovels is advantageous. Only enough machinery is being used to push the job 16 hours a day. A field check against the Seabee's estimate indicated that each of the 12 cu. yd. scrapers were moving 480 cu. yd. per 8-hr. shift on a 500-ft. haul. A 2½-yd. shovel loaded 100 cu. yd. per hour, into 5-yd. trucks.

Material is dumped in 12-in. layers, starting at the toe of slope where a fill is to be made. The slopes are brought up on a 1½:1 ratio. If a sheepsfoot roller is handy, it is used for as many passes as possible, but it has been found that a coral fill will settle under traffic and its own weight.

Each lift is smoothed out by the carryalls as they travel over the material on the return trip. When the fills reach blue top height they are dressed with a 11-ton smooth roller and a motor grader. The subgrade is then turned over to normal traffic for 10 days, after which time 12 in. of fine crushed coral is dumped and consolidated for a wearing surface. The finished surface, 45 ft. wide, will accommodate four lanes of traffic. It is expected that as soon as several bituminous mix plants on Guam become available for armor coating the highway that it will be black topped.

The equipment list for this job totals 3 power shovels, 25 dump trucks, 7 tractor drawn carryalls, 2 bulldozers, 1 push cat, 3 compressors, 2 smooth rollers, 1 sheepsfoot roller, 1 rooter and 1 No. 12 motor grader.

The job is nicely ahead of its 4-month construction schedule, and traffic is already speeding around the first two miles completed. One 800-ft. radius curve, banked on the outside to a superelevation of 3 ft. above normal, is already demonstrating that

RUGGED . . . STURDY . . . DEPENDABLE

JAHN TRAILERS are built for "Heavy Duty"

Jahn Heavy Duty Trailers are noted for strength, stamina . . . the ability to handle heavy loads continuously and overloads when necessary. Rigid, cross braced frame, improved gooseneck construction, spring mounted front axle and rugged rear axles . . . all enable Jahn trailers to stand up under heavy road shocks and occasional overloads.

New hydraulic brakes, available for all Jahn trainers, provide faster, smoother stops under all conditions, with equal brake pressure on all wheels. Uneven terrain has no effect upon them . . . full axle oscillation can take place without any reduction in braking efficiency. Write today for details.

THE NEW JAHN HYDRAULIC BRAKE APPLICATION . . .

JAHN *Heavy Duty* TRAILERS — Capacities from 5 to 100 TONS

"Come to Trailer Headquarters"

C. R. JAHN COMPANY 1345 W. 37th Place Chicago 9, Ill.

McCAFFREY TRACTOR SHOVEL

WITH RUD-O-MATIC CONTROL

These Features Make It Your Best Choice—

100% CABLE CONTROL OF BUCKET
Permits gradual dumping of the load.

★

WEIGHT CENTERED ON TRACTOR FRAME—

★

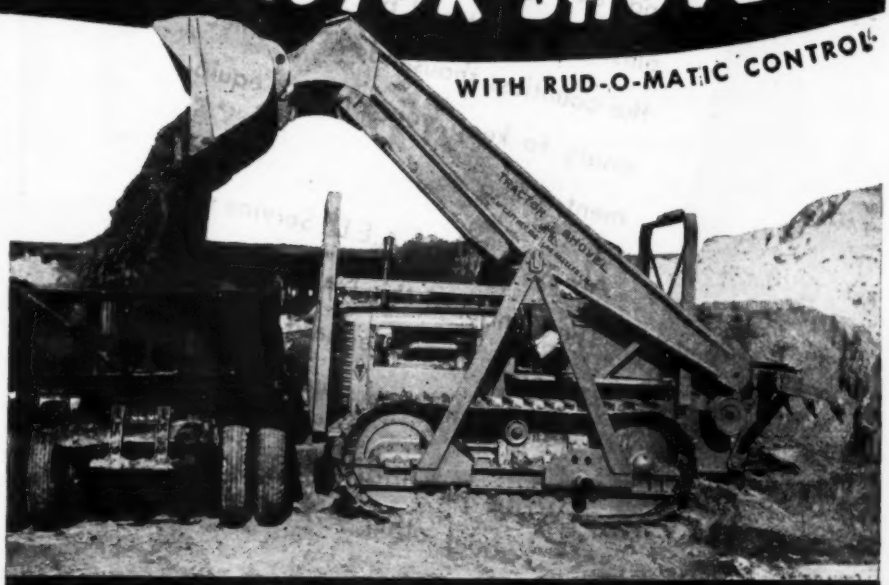
BUCKET CAN REACH OVER CENTER OF TRUCK BEING LOADED—

★

RIPPER CARRIED ON MACHINE READY FOR IMMEDIATE ACTION—

★

LOW OVER-ALL HEIGHT FOR TRANSPORTING—



DIGS • GRADES • RIPS • LOADS

M. P. McCAFFREY, INC.

2121 East 25th Street • Los Angeles 11, California
Kimball 7181

SAVE TIME

when your machine is down use your nearest

ASSOCIATED EQUIPMENT DISTRIBUTOR'S service shop

ASSOCIATED EQUIPMENT DISTRIBUTORS — MEMBER

There are over 600 A.E.D. Members and most of them have additional Branch Service Shops.

This makes a vast army of workers ready to speed the necessary repair parts to your job—ready to send out welding crews — ready to regrind worn surfaces—rebuild worn drums and axles — replace bushings and pins—reshape tread pin holes or do the countless thousands of jobs necessary to keep your present equipment rolling.

Always call in an A.E.D. Service man. The symbol of this National Organization is your safeguard for reliable workmanship and square dealing.

Write for additional information about other A.E.D. services.

BUY SAFELY - Buy from an A.E.D. Member

ASSOCIATED EQUIPMENT DISTRIBUTORS

NATIONAL PRESS BLDG. - WASHINGTON 4, D.C.

the Seabees have indeed built a superhighway in the heart of the Guam jungle.

This work is being done by Seabees operating under the direction of Commodore W. O. Hiltabidle, USN, Officer in Charge of the Fifth U. S. Naval Construction Brigade.

▼

New Equipment and Materials

New Hydraulic Operated Truck Crane

A new truck crane that is completely hydraulic operated with power taken direct from truck engine at idling speed, with no motor, gears, clutches, drums, linings or brakes, has been placed on the market by Milwaukee Truck Crane Co., 30 North LaSalle St., Chicago 2, Ill. The model H-6 has a 6-ton lifting capacity at 8 ft. radius. It has a telescopic line boom from 19 ft. to 32 ft, and telescopic outriggers to stabilize operation so that there is no weight on truck

Model H-6 Hydraulic Operated Truck Crane

except in transporting the unit. A light pull on the control lever extends hydraulic outriggers to 11 ft. It is stated to require less than 30 seconds to set up the machine for operation. One man operates the crane from the working deck. All pumps and control valves are interchangeable, and it is stated that there are less than 600 parts in the entire crane and only 15 parts are suggested as spares. The 6-ton is mounted on a 1½-ton truck. In addition to H-6 there will be three other models: Model H-2 with 2-ton lifting capacity, mounted on a "jeep", with telescopic

Welded for Strength & Service

WELLMAN

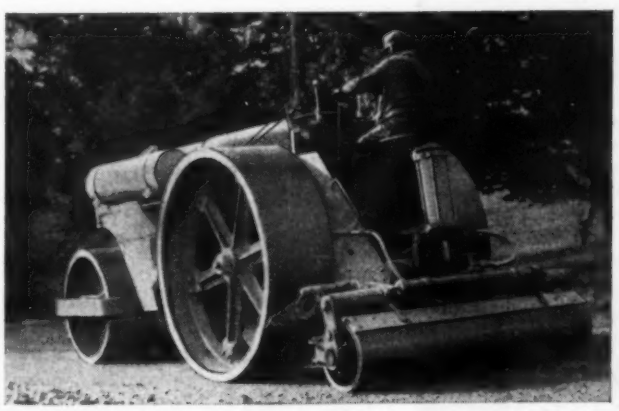
Williams BUCKETS

Welded Rolled Steel construction builds longer life and greater utility into Wellman buckets. Multiple Rope and Power Arm types. Dragline. Power Wheel. Special Service Buckets. ⅜ to 16½ yd. capacity.

Send for Bulletin

THE WELLMAN ENGINEERING CO.
7003 Central Avenue • Cleveland 4, Ohio
Sales and Service Agencies in Principal Cities

TALK TO THE MAN WHO KNOWS A HERCULES



He will tell you about the increased efficiency of its longer wheel base – because of the exclusive "Ironeroll" at the rear – and about its multi-purpose application and economy of operation.

Without hesitation we refer you to men who have used Hercules Rollers. You will find them everywhere.

•

For further information contact your nearest Hercules dealer or write direct to The Hercules Roller Co., Bucyrus, Ohio.

HERCULES ROLLER CO.
BUCYRUS, OHIO, U. S. A.

for HIGHWAYS & AIRPORTS

The modern JACKSON Vibratory Paving Tube is the only full-width internal vibrator for highway and airport paving, backed by many years satisfactory use under widely varying conditions. Proved performance certifies to the contractor and engineer that they will get desired results in efficient and economical operation, placement, density, strength and wearing surface of the finished slab. This holds true for the usual mixes designed for vibratory placement and those made with air entraining cements.

The JACKSON Tube is super-powerful, with plenty of reserve beyond the toughest jobs encountered . . . is easily attached to any modern conventional finishing machine . . . available in 10 to 25 foot widths . . . simple, dependable with all "bugs" out.

Get up-to-date on vibratory placement of pavement concrete. Write today for new JACKSON folder.

JACKSON VIBRATORY PAVING TUBE

Standard, full-width, dual vibratory tubes submerged horizontally in concrete have proved most efficient through years of exhaustive tests and extensive use. Powerful high-frequency vibratory impulses are transmitted in force through the thickest slab, quickly transforming the stiffest mixes into uniformly workable condition. If desired, other types of vibratory elements can be easily substituted with the same basic frame and carriage.

The reserve capacity of the power plant can be used to run hand operated vibrators in conjunction with the tube. The power plant also generates power for electric tools and lights used on night clean-up or emergency operations.

THERE IS A RIGHT JACKSON CONCRETE VIBRATOR FOR EVERY JOB

MANUFACTURED FOR

JACKSON VIBRATORS, Inc.

by ELECTRIC TAMPER & EQUIPMENT CO., Ludington, Michigan

boom under load from 14 ft to 22 ft. Model H-10 with 10-ton lifting capacity, mounted on a standard 1½-ton long wheel base truck with Thornton two-speed dual rear end, and with telescopic boom under load from 25 ft to 45 ft. Model H-20 with 20-ton lifting capacity, mounted on the same chassis as above model, with telescopic boom under load from 40 ft. to 60 ft.

▼

Compressor Generator Outfit

A new compressor generator outfit has been brought out by Schramm Inc., West Chester, Penn. The unit has an actual air delivery of 60 cu. ft. and is equipped with a 5 K. W. gen-

Compresser Generator Outfit

erator with adjustable floodlight that can be raised or lowered in accordance with requirements. The complete outfit is mounted on a 2-wheel spring trailer. The outfit is completely automatic with push button electric starter.

▼

New 6 Cu. Ft. Concrete Mixer

A new 1-bag concrete mixer, the Kwik-Mix 6-S Dandie, was placed on the market June 1 by the Kwik-Mix Co., Port Washington, Wis. Soon to be followed by new 16-S and 11-S models, the Kwik-Mix 6-S Dandie is welded throughout and utilizes high strength steel extensively. Strength is combined with light weight. A new selective skip shaker does not engage until the skip is partially emptied and ready for shaking. The established Dandie re-mixing action, combining buckets and blades inside the drum, provides thorough mixing. The tilted flow-line discharge chute, an exclusive feature on the Dandie mixers, is said to empty the drum

PERMAG Cleaning Compounds

Used for removing grease, oil, dirt before repairing or reconditioning Trucks, Tractors and other Road Equipment

PERMAG Cleaning Compounds always do the cleaning job quickly and efficiently, enabling the mechanic to complete the repair on schedule time.

Fleet owners depend on PERMAG Compounds for exterior cleaning of tractors, trucks and motors, garage floors and pits.

THERE'S A PERMAG COMPOUND MADE FOR EVERY CLEANING JOB.
Let us know your problems.

Nationally Represented. Warehouses in principal cities.

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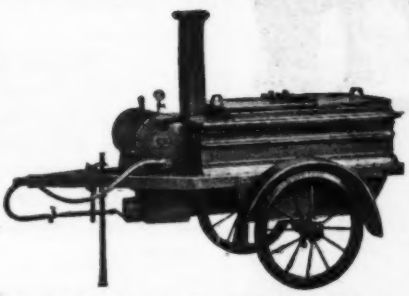
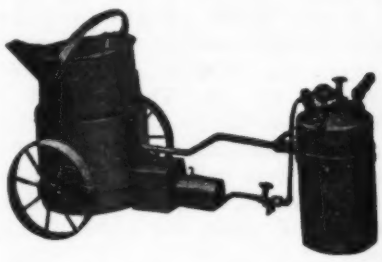
CONNERY'S HEATING KETTLE

For speedy heating of tar and asphalt—



Use this CONNERY oil-burning Patrol Patching Heater on the *small* job and this CONNERY oil-burning kettle for *large-quantity* production.



Write for catalog showing our full line of tar and asphalt heating kettles, spraying attachments, pouring sets, etc.

CONNERY CONSTRUCTION Co.
3900 North Second St. Philadelphia, Pa.

VOLUME PRODUCTION

to meet the Growing Demands of War and Industry for

WISCONSIN ~~Air-Cooled~~ ENGINES

Highly systematized, progressive assembly of Wisconsin heavy-duty air-cooled engines keeps them coming off the production line in a steady, uninterrupted stream. Every operation is handled by a thoroughly trained workman who performs his specialized job with speed and skill.

The picture shows a run of Model VE-4, V-type, 4-cylinder engines going through . . . for power destinations on many types of equipment. Perhaps one of these heavy-duty engines has been reserved for service on *your* equipment.

Most H.P. per pound

WISCONSIN MOTOR Corporation
MILWAUKEE 14, WISCONSIN, U. S. A.
World's Largest Builders of Heavy-Duty Air-Cooled Engines

Sea Going

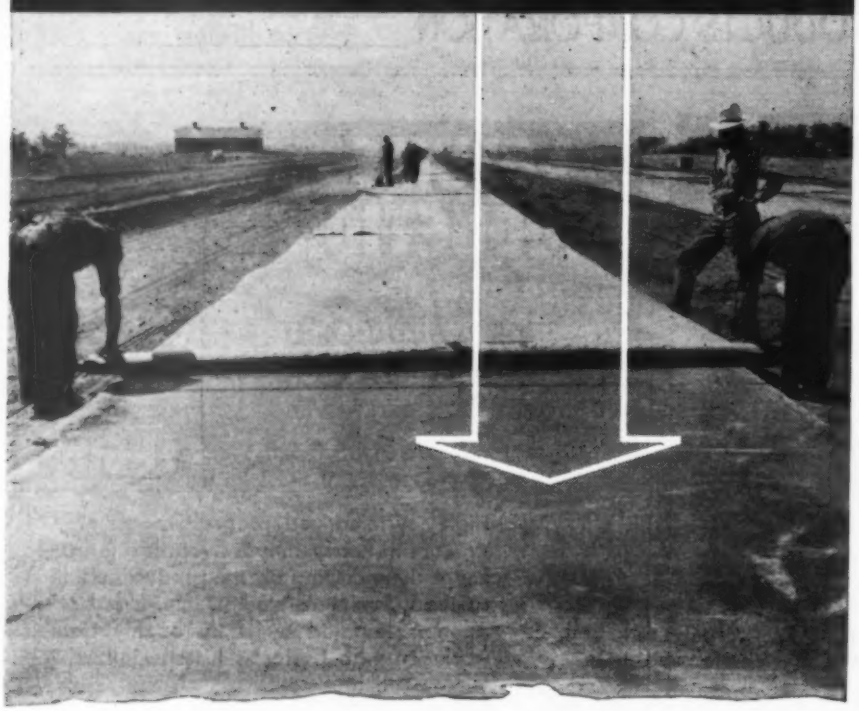
LIKE THE RUBBER LIFE RAFT

Certain types of Owen Buckets have grit-tight bearings, special lubrication and other features to adapt them to underwater digging and assure long life under this difficult service.

The OWEN BUCKET Company
6070 Breakwater Avenue • Cleveland, Ohio
BRANCHES: NEW YORK PHILADELPHIA CHICAGO BERKELEY, CAL.

OWEN BUCKETS
A MOUTHFUL AT EVERY BITE

98° TEMPERATURE . . . the Slab STILL WET after 96 hrs. with SISALKRAFT CURING Blankets



Not only was moisture sealed in during the first crucial 24 hours . . . but when the Sisalkraft blankets were rolled back 96 hours later, the slab surface was still wet . . . the finished surface hard, clean . . . ready for use, no dirt to blade, litter to remove, or scraping required.

Sisalkraft blankets are quickly and easily laid by two men . . . require no watching or sprinkling . . . can be used over and over again . . . save time, labor, money . . . assure A-1 curing and unmatched protection.

Found in the specifications of over 40 State Highway Departments and recognized as the country's No. 1 concrete curing agent . . . Sisalkraft is equally at home for general, all 'round job protection.

War production has restricted immediate availability — but after the war, as before, the Sisalkraft dealer organization will be ready to serve you in 48 states.

THE SISALKRAFT CO.
205 W. WACKER DRIVE · CHICAGO 6, ILL.
NEW YORK · SAN FRANCISCO · LONDON · SYDNEY

Manufacturers of SISALKRAFT, FIBREEN, SISAL-T, SISALTAPE AND COPPER-ARMORED SISALKRAFT

faster because it reaches deeper into the drum. Controls are conveniently located for high speed operation. The mixer is well balanced on automotive type leaf springs and pneumatic tires,

Kwik-Mix 6-S Dandie

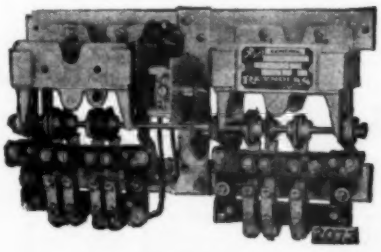
trails fast and handles easily. The Kwik-Mix 6-S Dandie mixes 6 cu. ft. of concrete plus 10% and complies with A.G.C. standards for this new size which replaces the 5-S and 7-S sizes.

▼

New Street Traffic Control

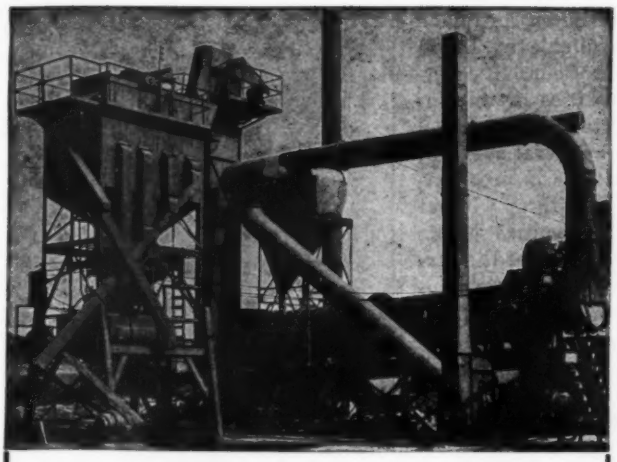
A new street traffic control has been brought out by the Reynolds Electric Co., 2650 W. Congress St., Chicago 12, Ill. This control is designed to handle troublesome left turn intersections as follows: For east and west traffic, the green is on for 30 seconds, during the latter three seconds of which the amber is also on.

The green and amber switches to red with a left turn green arrow. The arrow holds for 15 seconds and the red holds for 45 seconds. Then the green arrow and red north and south



Reco Traffic Control

signals switch to green north and south for 30 seconds, the red east and west remaining on. The amber light shows north and south traffic a coming change during the last 3 seconds



INCREASED EFFICIENCY AND PRODUCTION IN *Asphalt Mixing*

A larger fan, new horizontal cyclone dust collector, and new duct system are among the refinements that make this H & B portable plant even more compact and efficient. Exhaust fan, motor which drives the dryer, and speed reducer are combined in one completely assembled unit, mounted on a separate platform. A new type of screen reduces overall height—without reducing bin capacity. Write for complete information.

HETHERINGTON & BERNER INC.
721 Kentucky Ave., Indianapolis 7, Ind.

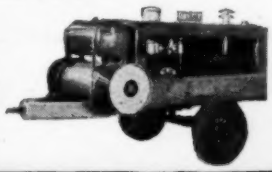
ONLY DAVEY COMPRESSORS HAVE *GUARANTEED-FOR-LIFE* VALVES

THE famous Davey Air Aristocrat compressor is the only portable air compressor with valves that are guaranteed for the life of the unit. All other parts of this rugged compressor embody the same skilled engineering, precision manufacturing and high-quality materials that make the valve guarantee possible.

Davey air-cooled aluminum alloy cylinder heads dissipate heat three times faster than ordinary heads made of cast iron. This heat-dissipating factor is the reason why the carbon-free stainless steel valves do not warp, crack or carbonize from overheating—making the lifetime valve guarantee possible. It is one of the reasons why Davey Compressors deliver their rated air capacities over a longer period of time—providing greater efficiency from air tools, better use of manpower and greater long-run economy.

For Complete Information on all Davey Air Aristocrat models and Davey Industrial Compressors, Auto-Air Compressors, Heavy Duty Truck Power Take-Offs and Pneumatic Saws, write for free Davey Catalog E-172.

D-845-7



DAVEY *Compressor Co.*
KENT · OHIO
DEALERS IN PRINCIPAL CITIES

This SHOVEL Gets Around F-A-S-T!

With road speeds up to 30 miles per hour the Mobile Michigan is on the job and earning for you more hours per day. Built in ⅜ yard and ½ yard sizes. Convertible to Crane, Clam, Dragline, and Trench Hoe.

WRITE FOR BULLETIN 5-4

MICHIGAN
POWER SHOVEL CO.
BENTON HARBOR, MICHIGAN

HOW FLINK *Self-Feeding* SPREADER DOES SEAL COATING BETTER

No Helper Required on Back

Spreads an even layer of material, thick or thin—as desired, as the truck is backed up . . . thus avoiding damage to tires or leaving tracks on oil. Spreads full width of street. Does it faster, smoother with less help.

Flink self-feeding material spreaders save time, materials and reduce accidents. Proved in tough road construction and maintenance jobs all over America.

Faster. Operated by driver from cab who can throw spreader in and out of action as he approaches or leaves area to be spread.

No helper. Raising the dump truck causes load to fall towards spreader. This plus positive agitation eliminates man on back.

Fits all dump trucks. The Flink spreader is a replacement end gate, it is not a body, a trailer or a "gadget".

Does not limit use of truck. Dumps same as with regular end gate, or replace original end gate in 5 minutes. Continue to use truck for all other purposes.

Efficient use of materials. Spreads thick or thin, evenly . . . without barespots as with hand or revolving disk methods. Spreads all materials up to 1". Write for complete information.

Flink Spreaders are ideal for all types of road and street spreading, for ice and dust control, for spreading agricultural limestone.

The FLINK COMPANY
508 VERMILION STREATOR, ILLINOIS

of green and switches with the green to red north and south and green east and west, completing the cycle. The flashing action of this control is sharp and clean, the amber and green going off together. The device is strongly built and designed to give long uninterrupted service. This new traffic control is equipped with silver contacts. It has a synchronous motor for operating on 115 volt 60 cycle A. C. current. However, it can be equipped when so ordered with whatever number of circuits may be required and arranged for other current specifications and time cycles.

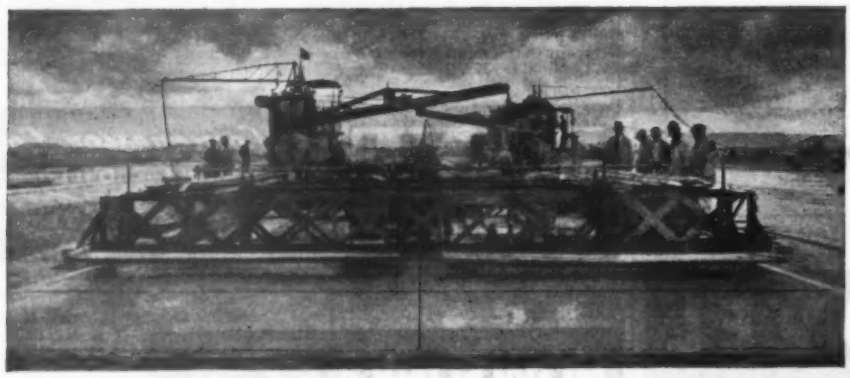
New Survey Instrument

A new multi-purpose survey instrument—the Willis Pendulum Astrolabe—has been made available by David White Co., 315 West Court St., Milwaukee 12, Wis. The uses of this instrument include: Establishing control points for aerial and general surveys; identification of locations in prospecting or on other work, with or without mapping; establishing control points for treatment of deflections of the vertical in geodetic surveying; determining time; teaching practical astronomy. The pendulum astrolabe is an

Willis Pendulum Astrolabe

optical instrument having a glass reticle with 5 curved lines which represent 5 circles of constant altitude over which images of stars may be observed to transit. Stars brighter than about the 7½ magnitude may be observed. By the appropriate arrangement of a mirror on a pendulum with spring suspension and air damping, the effective altitudes of the reticle lines (which are not pendulous) are

"S-O-M-E-T-H-I-N-G G-O-O-D"



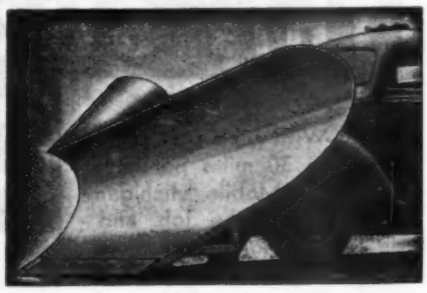
Numerous new types of contraction joints and methods of installing them have been tried and discarded.

The value of the 1/8" "FLEX-PLANE" ribbon type joint and "FLEX-PLANE" machine for installation has been proven.

The State . . . secures better roads.

The Contractor . . . secures value in speed—uniformity—less supervision.

FLEXIBLE ROAD JOINT MACHINE CO.
WARREN, OHIO



ROOT INTERCHANGEABLE SNOW PLOWS

Highway Commissioners, Road Engineers and Supervisors of road maintenance prefer Root Interchangeable Snow Plows for opening up streets, highways and airport runways, removing barriers of snow and ice. Get the facts, investigate maintenance costs ...you'll understand the reason why Root plow units "get the nod" when purchasing decision is made by those charged with snow removal in the road, street and airport field.

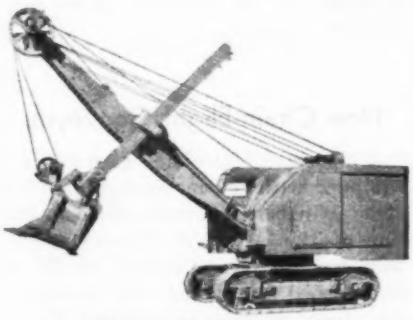
Write for Bulletin

ROOT SPRING SCRAPER CO.
Kalamazoo 11, Mich.
Builders of road maintenance equipment since 1890

made to be constant within about a tenth of a second of arc even when the non-pendulous parts of the instrument are out of level a minute of arc. When not in use, the pendulum is held by four clamping thumb screws. If the Greenwich times or standard-zone times of the transits of three or more identified stars over one of the reticle lines are observed, the longitude and latitude of the observing station may be computed. Attainable instrumental accuracy is 0.1 second of arc, or better (less than 10 ft of longitude or latitude).

New 1½ Yd. Shovel

A new 1½ yd. shovel-crane-dragline, the Koehring 605, has just been announced by the Koehring Co., Milwaukee, Wis. The 605 is the second addition to the Koehring postwar line, following the recently announced Koehring 205½ yd. excavator. Three basic requirements have been stressed in the design of the new Koehring 605: Ease of operation, basic strength and simplicity, quick convertibility. Main drum clutches of the 605 are of a new, improved design. Power engaged but manually released, they enable the operator to retain the "feel" of the load at all times. Frequent adjustments are unnecessary. Independent power or live boom control or a

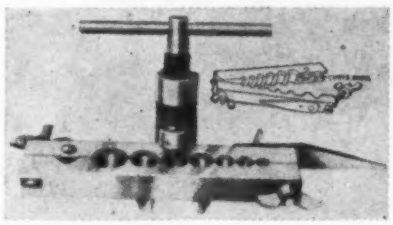


Koehring 605 1½ Yd. Shovel

combination of both are available. The shovel dipper trip is the trigger-fast pawl-and-ratchet type that is exclusive on Koehring excavators. Crowd-retract and swing-traction clutch levers work easily because troublesome partial engagement of the unused clutch is eliminated by a new double fulcrum linkage. The high "A" frame on the 605 is raised or lowered by power. Hook rollers are easily adjusted. Main shafting on the 605 is straight. Shoulders and keyways have been eliminated. Separate crawler frames give the lower assembly added flexibility. The 605 shovel boom has an improved foot shock absorber. A simplified shipper shaft assembly is designed to be easily removable. The 605 dragline fairlead is pin-mounted for quicker conversion.

New Tube Flaring Tool and Cutter

A new tool for flaring all popular sizes of tubing used on tractors, trucks, automobiles, etc., has been added to the line of the Owatonna Tool Co. This tube flaring tool and cutter is provided with seven flaring discs 3/16-in., ¼-in., 5/16-in., ⅜-in., 7/16-in., ½-in. and ⅝-in. The tool gives just the right taper without flattening or distorting tube, and assures a perfect tight-fitting joint. Does not have to be clamped in a vise. Built-in cutter. Reamer folds back against tool when not in use. For full information and name of your nearest OTC jobber, write to Owatonna Tool Co., 319 Cedar St., Owatonna, Minn.



OTC No. 835 Tube Flaring Tool and Cutter

TROJAN

SELF POWERED

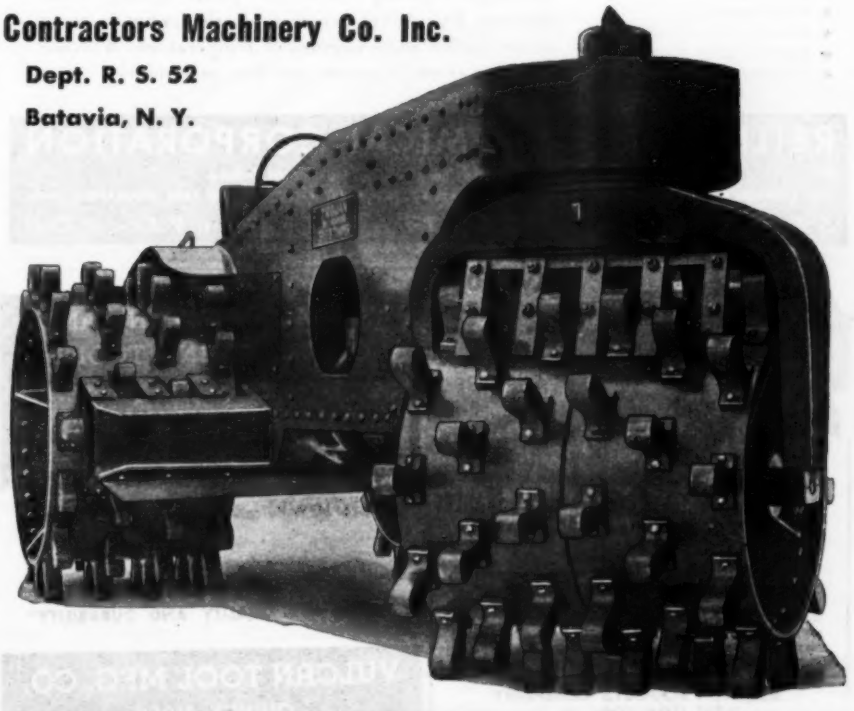
SPEED TAMPERS

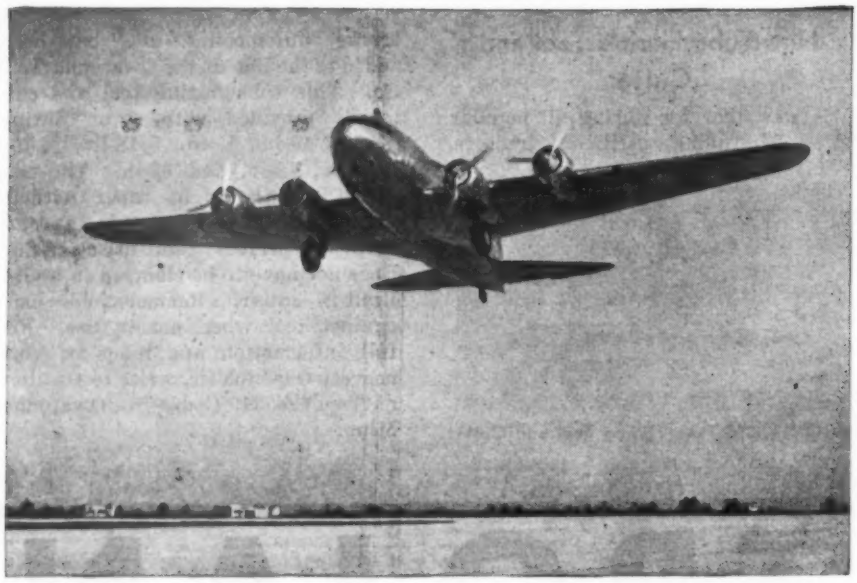
Are being used on Airport Construction jobs because of their superior design. Denser fills and even tamping over entire area, combined with speed, makes this machine efficient and economical to operate. There are no "soft spots" with a Trojan Tamper on the job! Write for literature.

Contractors Machinery Co. Inc.

Dept. R. S. 52

Batavia, N. Y.





BITUVIA HOT PLANT MIX

for Airport Runway Base and Wearing Courses

BITUVIA Road Tar

—and other REILLY Road and Airport Materials

- Concrete Curing Compound
- Traffic Line Paint
- Bridge Paint
- Pipe Enamel
- Tar Remover
- Wood Preservatives
- Creosoted Guard Rail Posts
- Creosoted Bridge Timbers
- Creosoted Piling

● Runway installations using BITUVIA ROAD TAR RT-11 and RT-12 are giving perfect results in many important airports. This BITUVIA application gives maximum bitumen content, freedom from sub-base vegetation, and a long-lasting, skid-resistant surface.

Other BITUVIA applications for road construction and maintenance include BITUVIA ROAD MIX, BITUVIA COLD PATCH, BITUVIA RETREATMENT, BITUVIA TAR PRIME and BITUVIA BASE STABILIZATION. Pocket-size manual giving specifications for these applications will be sent on request.

PLASTUVIA *Crack and Joint Filler*

PLASTUVIA bonds firmly with concrete, brick or stone, thoroughly sealing cracks and joints against water damage. PLASTUVIA remains plastic under years of heavy traffic and extremes of temperature. Will not check or crack in winter, nor flow in summer.

REILLY TAR & CHEMICAL CORPORATION

Executive Offices: Merchants Bank Building, Indianapolis, Indiana

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SEVENTEEN · PLANTS · TO · SERVE · YOU

SAVE 50%
● on Fuel
● on Time

Aeroil Heet-Master
HEATS AND MELTS ASPHALT

TWICE AS FAST

The ONLY insulated tube fired kettle with a completely removable heating unit (for quick and easy cleaning). The ONLY kettle with the burner INSIDE. Now available on pneumatics (and with mud guards too at slight extra cost). Send for FREE Bulletin No. 209HR. For paving tools and accessories write for Leaflet No. 141RS.

AEROIL PRODUCTS COMPANY
WEST NEW YORK, N. J.
Chicago · San Francisco · Dallas

VULCAN PAVEMENT AND CLAY DIGGING TOOLS

ARE MADE in a complete line of sizes to fit all standard compressed air hammers.

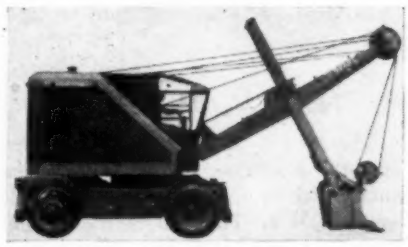
Send for NEW Vulcan Illustrated CATALOG today.

VULCAN TOOLS — THE WORLD OVER — NOTED FOR QUALITY AND DURABILITY"

VULCAN TOOL MFG. CO.
QUINCY MASS.

New ½ Yd. Shovel

A new ½ yd. full circle, mobile, one man operated power shovel has been announced by The Byers Machine Co., Ravenna, O. The unit has a specially engineered heavy duty lower chassis. It has 4-wheel drive traction and steers under the control of the same man who operates the unit as a shovel or crane. It has a short coupled lower chassis which permits 360 degree shovel operation. Speed of travel,

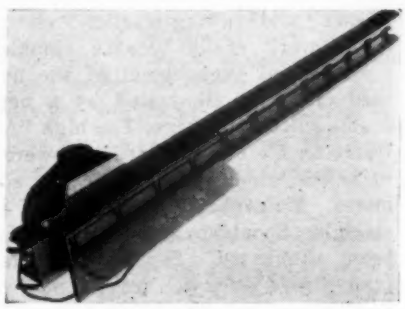


Byers' "Traveler" ½ Yd. Excavator

traction effort, air braking and hydraulic steering are all specially designed for this unit. Timken Detroit axles, Ross steering gear unit and Vickers hydraulic ram to augment hand steering control are employed. Overall width of the lower chassis is 8 ft. to meet state highway regulations. Wheel base of 9 ft. permits digging over front and rear of the machine. The unit has forced oil lubrication of all enclosed gears and "Airflex" clutches.

New Chain-Flight Conveyor

A portable electric conveyor equipped with 1¾ in. chain-flights instead of a belt has been added to the line of the American Conveyor Co., 2435 Indiana Ave., Chicago 16, Ill. It is designed for raising bulk materials up steep pitches impractical for a belt. The conveyor is built in four sizes—two widths 8 and 12 in. and two lengths 13 and 20 ft. It lifts up to 14 ft. and is stated to be capable



The Flight-Veyor

of delivering material at the rate of 160 ft. per minute. All models are equipped with 40 ft. heavy duty, rub-

ber covered cable; drive is by means of roller sprocket chains through counter shaft; sprocket shafts mounted on self-aligning ball bearings permanently sealed .to retain lubricant and keep out dirt; two steel-frame, 6 in. take-ups at head pulley; heavy duty double pole switch, housed in protecting box; rigid, heavy gauge steel frame, welded throughout. Heavy high carbon steel flight pan.

▼

Bay City Shovels Expands Facilities

Bay City Shovels, Inc., Bay City, Mich., has recently completed its third plant extension since Pearl Harbor. The new addition is estimated to increase output of both crawler and pneumatic-tire-mounted excavating material handling equipment by 30 percent. The rubber-tired cranemobiles being produced in larger quantities are of 10, 16½ and 20 ton type, mounted on specially designed crane carriers, for use in the successful prosecution of the war against Japan. These and crawler mounted convertible shovels, cranes and draglines in sizes from ⅜ to 1¼ cu. yds. will be available for civilian use following V-J Day.

Obituaries

LEE WRIGHT, 58, superintendent of construction for the past 24 years for E. T. Frank, East Lansing, Mich. bridge contractor, died June 17 in Lansing, Mich. Mr. Wright entered the construction field in 1919 and since that time has built some 75 bridges throughout lower Michigan.

▼

CLARENCE HICKEY, 56, state highway director of Washington, died June 20, at Olympia, Wash. Prior to his appointment as head of the state highway department, he was county engineer of Snohomish County, which position he had held for 16 years.

▼

JOSEPH WHITE, 67, retired engineer, died June 14, in Torresdale, Penna. He had worked on the Panama canal and had built roads and railroads in the Philippines.

▼

LOUIS F. CUTTER, 88, civil engineer, Boston, Mass., died June 27 in Randolph, N. H. He was a pioneer in trail mapping in the White Mountains.

Winning Combination

In the Insley Excavator, you get a hoist and swing mechanism with the winning combination for longer wear-life, easier maintenance, simpler operation. All 10 ball bearings are shielded . . . pre-lubricated for the life of the machine . . . no grease works into clutch or brake. Its two main drum clutches and two swing clutches are all identical . . . one spare clutch band is all you need. The drum shaft is extra large and is accurately ground. Gears are cut from solid steel blanks.

You'll like these features of design and construction because—*like every other Insley feature*—they contribute to *lower cost yardage.* For your new equipment—when we can again supply it—choose a ⅜ or ½-yd. Insley Excavator . . . with five easily interchangeable attachments—shovel, crane, hoe, clamshell and dragline.

INSLEY MANUFACTURING CORP., INDIANAPOLIS 6, IND.

OLAF LAUREGAARD, 65, for 16 years city engineer of Portland, Ore., died June 23, in Alameda, Calif., where he was working with the U. S. Maritime Commission. Mr. Lauregaard left Portland in 1933 to join engineering staff of the Tennessee Valley Authority.

▼

LINCOLN DEGROTT MOSS, 82, former Professor of Engineering at Columbus University, died June 14, in Babylon, N. Y. He had retired from Columbia in 1929.

LEONARD D. BROWNELL, 67, since 1920 district engineer in charge of highways, canals and state buildings for the New York State Department of Public Works in six counties, died June 17 in Utica, N. Y. From 1915 to 1920 he was district engineer with the state highway department with headquarters at Syracuse, N. Y.

▲

CHARLES R. WHITTIER, 88, a civil and mechanical engineer for 68 years, died last month in New York City.

MORE AND BETTER ROADS
the Calcium Way

Local highway officials in many areas have worked wonders building good roads, The Calcium Way. They have built them with local labor and local soil materials treated with calcium chloride.

That's the way to get more and better roads for the money—the way to make low-cost roads give longer wear and satisfactory service — the way to make them dustless, smooth and clean.

Local soil materials, bound together with the moisture bond that calcium chloride supplies and holds, will compact under traffic into a consolidated mat. Such a roadbed sheds rain and lessens frost heaving. Properly treated with calcium chloride it does not dry out, so it cannot crumble and blow away.

This type of road can be built for less The Calcium Chloride Way. It can be maintained at a fraction of the cost of maintaining untreated roads and will provide the finest type of base for later concrete or blacktop paving. You do get more and better roads The Calcium Chloride Way. Bulletin No. 29 tells how. It is sent on request.

Calcium Chloride Association
4145 Penobscot Building
Detroit 26, Michigan

With the Manufacturers and Distributors

New Distributor for Davey

The Construction Equipment & Supply Co., Brushton Ave. at Thomas Blvd., Pittsburgh, Pa., has been appointed distributor for products of Davey Compressor Co., Kent, O. Davey operations of the new dealer will embrace the western area of Pennsylvania and the northern panhandle section of West Virginia. The new company was recently formed through a partnership arrangement by five brothers, John C. T., Peter J., Valentine, Thomas, and Paul Conte, and John T. Parea, Jr.

▼

Maj. E. E. Greiner Returns to Buffalo-Springfield

Maj. Edward E. Greiner, executive vice-president, Buffalo-Springfield Roller Co., Springfield, Ohio, is now back with the company after more than 2½ years' service with the U. S. Army Air Forces. His return to inactive status was announced by Colonel Walton M. Modisette, Camp Atterbury. A company spokesman pointed out the timeliness of this development in view of the fact that Buffalo-Springfield is in the midst of an expansion program designed to increase production of rollers 60% at "the urgent request of the U. S. Army Engineer Corps."

▲

John Elwood New Caterpillar Assistant Factory Manager

John Elwood

John Elwood, general superintendent of the tractor manufacturing division of Caterpillar Tractor Co., Peoria, Ill., since January, 1944, has been appointed assistant factory manager. Mr. Elwood joined "Caterpillar" in 1926 as a machinist, and the following year was made foreman in the gear department. In 1928 he became night superintendent in the tractor manufacturing division and remained in that capacity until his promotion to general superintendent of that division in 1944.

▼

Evans Expands Sales Organization

Evans Machinery & Equipment Co., Distributors, 770 South Schuylkill Ave., Philadelphia, Pa., has expanded its sales organization by the addition of the following representatives: Norman T. Peil, 319 Monroe St., Easton, Penn., to cover various counties in Pennsylvania. Clarence B. McCormick, Bridgeton, N. J., to cover Cumberland County, New Jersey. William I. Leonard, Jr., New Lisbon, N. J., to cover Burlington County, New Jersey.

▼

Three Mack Truck Promotions

Three new appointments in the Mack Sales Department have been announced by A. C. Fetzer, vice president of Mack-International Motor Truck Corp. Harold Connor has been named manager of the Bronx and White Plains Branches in the territory of the Greater New York Division. John J. Byrne, formerly in charge of national account sales for the Central Division territory, has

been appointed bus sales manager for the same territory. His post as national account sales manager will be filled by R. J. Meinert who has just returned to Mack's Central Division after a two years' leave of absence.

▼

H. J. Schorle New Works Manager for Worthington

H. J. Schorle

Herman J. Schorle has been named works manager of the Holyoke Works of Worthington Pump and Machinery Corporation. He succeeds Harry A. Feldbush, who has assumed administrative duties at the corporation's general offices in Harrison, N. J. Schorle was former executive engineer at Holyoke and assistant works manager. Assisting him is Willard A. Emery, former superintendent of all welding operations when Holyoke was producing 90 mm. anti-aircraft guns and Navy 5 in. dual purpose guns. Worthington's Holyoke manufacturing plant today produces portable and automotive air compressors, contractor's air tools, refrigeration units, air conditioning equipment, and vertical turbine pumps.

▼

American Brake Shoe Division Advances J. L. Mullin

The American Manganese Steel Division of the American Brake Shoe Co. has announced another advancement for J. L. Mullin with his current promotion from general superintendent of foundries to vice president in charge of operations. Mr. Mullin will carry on his new duties from the Amsco headquarters at Chicago Heights, Ill.

J. L. Mullin

Associated with the manganese steel industry since 1914, when he joined the Edgar Allen Manganese Steel Co., forerunner of the present Brake Shoe Division, as a clerk in the annealing department, Mr. Mullin has advanced steadily through the offices of local purchasing agent, foundry superintendent, works manager at the New Castle, Del., plant, and general superintendent of foundries.

WHEN SLUDGE SAYS

"WHOA" TO YOUR HORSEPOWER

Switch to

AMALIE PENNSYLVANIA H-D OIL

If motor troubles are jamming your operating schedules, it will pay you to put AMALIE H-D oil to work for your equipment at once.

AMALIE H-D is straight-run refined from 100% Pennsylvania Crude and has all the important characteristics of a *complete* heavy-duty oil. It has the necessary detergent quality . . . cleanses and washes away carbon and other harmful products of combustion. Its anti-oxidant action keeps oil from oxidizing and forming varnish and sludge deposits on vital parts.

Its strong, tough, corrosion-resisting film—20% *oilier*—stands up under the toughest operating conditions.

Remember AMALIE H-D Oil — and don't forget regular AMALIE Pennsylvania Motor Oil and AMALIE Lubricants.

For Essential Trucks • Busses • Tractors • Construction Equipment

See your AMALIE Distributor For This A. C. D. S. Test

Your AMALIE Distributor offers you the opportunity to have the used oil from the crankcases of troublesome equipment tested and analyzed impartially by skilled laboratory technicians. AMALIE CRANKCASE DRAINALYSIS SERVICE has helped many contractors to put an end to costly troubles and lay-ups. No obligation.

Ask your nearest AMALIE Distributor, or write Dept. R S

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GUTTER-SNIPE
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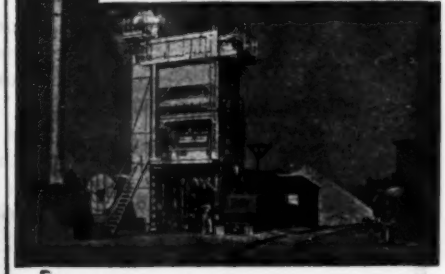
PORTABLE ASPHALT PLANTS
High Production—Low Cost



THE McCARTER IRON WORKS, INC.
NORRISTOWN, PENNA.

● These 3 standardized sizes of Erie general purpose Portable AggreMeters are serving all parts of U.S.A. In writing for data, refer to size required: GA 36 yd. or 54 ton
GA 52 yd. or 78 ton
GA 68 yd. or 102 ton

Address: 357 Geist Rd.

ERIE STEEL CONSTRUCTION CO.
ERIE, PENNSYLVANIA
AggreMeters • Buckets • Concrete Plants • Traveling Cranes

SAVE LABOR! CUT COSTS!
With Sauerman Scrapers

Explanation of Picture
Above is a 1/3 cu. yd. Sauerman Scraper hauling gravel out of a wide pit to a crusher that feeds a portable screening plant on a road project.

Crescent Scraper Bucket
Exclusive feature of Sauerman Scraper Machines is the Crescent bottomless bucket which handles large loads faster and with less line-pull than any other scraper.

THOUSANDS of wise engineers and contractors have found that Sauerman Scraper Machines make easy work of many excavating and material handling problems that would be costly by any other method.

Digging, hauling and automatic dumping are merged into a continuous, rapid operation controlled by one operator. Power requirement is moderate. Maintenance is simple.

Sauerman machines offer handling capacities from 10 to 600 cu. yd. per hour and operating spans from 200 to 1500 ft. Specifications of the various sizes and types of machines, together with illustrations of their uses are given in the Sauerman catalogs. Write for this literature today.

SAUERMAN BROS., INC.
588 S. Clinton St., Chicago 7, Ill.

Portland Cement Association Changes

New assignments of Portland Cement Association staff personnel have been announced by Wm. M. Kinney, General Manager of the Association, to be effective June 15.

M. J. McMillan, Manager of the Washington Office since 1936, goes to New York as Regional Manager of the Eastern Offices, 347 Madison Ave., New York 17.

James E. Dunn, District Engineer of the Richmond, Va., office since 1938, becomes Manager of the Washington Office, 837 National Press Building, Washington 4, D. C.

Gordon S. Maynard, field engineer in North Carolina and Virginia for the Association since 1937, becomes District Engineer with headquarters at 1210 State Planters Bank Building, Richmond 19, Va.

Working with Mr. McMillan in supervising Association activities in the Eastern region will be, E. M. Fleming, District Manager, New York, in charge of field activities in Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont, and G. C. Britton, District Manager, Philadelphia, covering Delaware, Maryland and Pennsylvania.

▲

New Worthington Distributors

The following distributors have taken on the distribution of the construction equipment line of Worthington Pump and Machinery Corporation in their respective areas: Clark-Wilcox Co., 118-124 Western Ave., Allston, Boston, Mass.; Maine Truck Tractor Co., 158 Veranda St., Portland, Me.; The Howard Corporation, 27 S. Meramec, Clayton, Mo.; A. M. Flanders, Inc., 411 N. Main St., Barre, Vt.; Milton-Hale Machinery Co., P. O. Box No. 8, 1024 N. Broadway, Albany, N. Y.; Landes Engineering Co., 171 W. S. Temple, Salt Lake City, Utah; Coast Equipment Co., 948 Bryant St., San Francisco, Calif.

▼

Lima Appoints F. L. Maus District Manager

Lima Locomotive Works, Incorporated, Lima, O., has announced the appointment of Fred L. Maus to the position of district manager of the Shovel and Crane Division. Mr. Maus will have charge of the Texas territory with office and warehouse located at 1304 McKinney Ave., Dallas, Tex. Prior to his appointment as district manager he was employed as salesman in the Memphis, Tennessee territory.

Wickwire Spencer and Colorado Fuel & Iron Merger

The board of directors of Wickwire Spencer Steel Co. has accepted in principle the proposal of the directors of Colorado Fuel & Iron Corporation for the merger of the two companies, and appointed a committee of the Board, consisting of E. C. Bowers and R. T. Dunlap, to negotiate a formal merger agreement with the directors of Colorado Fuel & Iron Corporation. When a merger agreement has been approved by the directors of both corporations, it will, in accordance with applicable laws, be submitted to the stockholders of the respective corporations for their action.

▼

L. R. Russell Appointed Chief Engineer

L. R. Russell

W. B. Elliott, president of the Insley Manufacturing Corporation, Indianapolis, Ind., has announced the appointment of Louis R. Russell as chief engineer of the company's crane and shovel division, in charge of research, design and development of present and future models. Mr. Russell, a native of Kansas, has a background of 38 years experience in design engineering with several other leading shovel companies, including the Erie Shovel Co., Bucyrus-Erie Co., The Koehring Co. and the Marion Steam Shovel Co. His appointment will permit Frederick B. Ray, chief engineer of the concrete equipment division and a specialist in that line during his 25 years with Insley, to devote all his time to research and development in the field of concrete equipment.

▼

Atlas Proposes $400,000 Laboratory Expansion

An appropriation of $400,000 for the construction of new units to expand the Wilmington research facilities of Atlas Powder Co., Wilmington, Del., has been approved by the Board of Directors. Construction of the new facilities will go ahead as soon as WPB approval is received. The new buildings will be designed for process development on a semi-works scale, to work out methods of manufacture preparatory to large scale manufacture.

PISTON-TYPE CONTROL VALVE

CENTER-LIFT HOIST

REVERSIBLE TAILGATE HARDWARE

EASY-REACH TAILGATE LEVER

HOIST MOUNTS ABOVE FRAME

ACCESSIBLE HOIST CYLINDER

PATENTED TIRE AND TOOL PACK

DASH CONTROLS FOR HOIST AND TAKE-OFF

Only from Hercules do you get all these advantages for easy, low-cost, efficient operation and maintenance. For example—consider the fingertip controls which operate Hercules hoists and power take-offs. Pull out two buttons . . . up goes the body and the load is dumped. Push the same two buttons . . . the body slips down into road position. Simple, isn't it? And it's only one of a host of reasons why you'll want Hercules dump bodies for your postwar trucks.

Until you can get the new Hercules dump body you want, let your Hercules distributor keep your present equipment in running order. He will furnish the service you need.

HERCULES
DUMP BODIES AND HYDRAULIC HOISTS
SPLIT SHAFT POWER TAKE-OFFS • COAL CONVEYORS

Ask About Turn-O-Matic Cement Boxes for Bulk Cement—Now Available—Write Today!

HERCULES STEEL PRODUCTS COMPANY . . GALION, OHIO

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VULCAN PAVEMENT AND CLAY DIGGING TOOLS

ARE MADE in a complete line of sizes to fit all standard compressed air hammers.

Send for NEW Vulcan illustrated CATALOG today.

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RELIANCE

CRUSHING, SCREENING and WASHING UNITS

● Up to 2000 Tons a Day ●

Crushers, Elevators, Sweepers, Screens, Wash Boxes, Bins, Pulverizers, Feeders, Screeders, Kettles, Conveyors, Drag-Lines "GAYOO", Centrifugal Air Separators

RIVELS-L E[illegible] MFG. CO.
Kingston, N. Y.
Canadian Representatives: F. T. Hopkins & Co., Ltd. 340 Canada Cement Co., Montreal, Que., Can.

A VALUABLE ROGERS LONG-BEDD TRAILERS FEATURE

FORMERLY tire changing required jacking up the trailer and in some cases the removal of the whole axle unit. A big job in any event that was especially difficult if a tire went out while carrying a load.

With Rogers Trailer this job is comparatively easy, as it is possible to remove any tire without disturbing other casings.

ROGERS BROTHERS CORP. ALBION, PENNA.

EXPERIENCE builds 'em — PERFORMANCE tells 'em

BUILD *Faster*-
BUILD *Better*
WITH
"QWIK-LOCK"
EXPANSION JOINT ASSEMBLIES

Quick installation . . . foolproof functioning . . . dependability. That's what you get with *"QWIK-LOCK"* Expansion Joint Assemblies. They not only assure easy positioning and locking of dowels, but also accurate positioning of dowels parallel to each other and to the subgrade. "QWIK-LOCKS" are designed for better road building, faster construction, and lower costs.

Write for the Catalog of Construction Accessories today.

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CONCRETE & BUILDING SPECIALTIES, Ltd.
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WILLIAMS WALLACE COMPANY
100 Hooper St., San Francisco, California

FOR SALE

1—Barber-Greene Asphalt Spreader.....$3750.00
1—Foote Paver 4000.00
1—Huber Roller—Gas, 10 ton (three wheel) 1750.00
3—Steam Tandem Roller.....(Prices vary)
1—Barber Asphalt Plant—2000# box.....15000.00
1—Acme stone crusher, screens and elevator equipped with McCormick Deering power unit 1200.00

Phil H. McGuire
P.O. Box 34, 35th Street Station, Norfolk 8, Va.

WANTED: A Graduated Chemist experienced in general highway chemical laboratory work, especially analyses of cement, paint and bituminous materials. Write H. C. Weathers, State Road Department, Gainesville, Florida.

ASPHALT TANKS

● 19—6,000 gal., 8,000 gal., and 10,000 gal. capacity heavy R.R. car tanks with heating coils.

Immediate shipment from Illinois—Louisiana—New Jersey

L. M. Stanhope — Wayne, Pa.

TIRE REPAIRS

All sizes truck, tractor and 1400x24 tires. Our Equa-Flex repair is built for heavy and rough work.

It is guaranteed for six months, if the repair fails your money will be refunded.

WALLACE TIRE SERVICE, Inc.
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FOR SALE

1—150 h.p. Diesel Engine
1—110 cu. ft. Air Compressor
1—160 cu. ft. Air Compressor
Compressors mounted on trailers
1—Thew Steam Shovel and Crane with 1¼ yard rock bucket.

Stiers Bros. Construction Co.
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For Sale

One (1) Littleford 4200 gallon insulated distributor with Twenty-four (24) Foot bars. Can also be used as transport truck. Built in 1942.

With or without White Model 720 tractor.

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FOR SALE

1—Ord Finishing Machine—20'-22'
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1—Adams 12 ft. Leaning Wheel Blade Grader
1—Austin Hydraulic 12-Yd. Scraper
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Chicago Heights Coal Co.
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FOR SALE

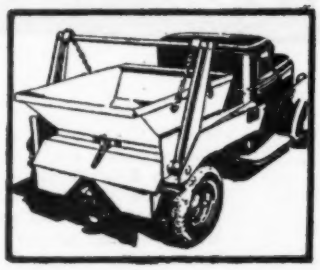
UNIVERSAL TOOLS!! { Pipe Wrench, Channellock Pliers, Adjustable Wrench, CHROME Pliers, Diagonal Cutters, Hammer, Screwdriver, Vise-Grips, Hack-Saw, Cold Chisel } $10.95 10 Pc. SET

Mail Orders Shipped Promptly, Remit with Order. Catalogue Free with first order. Remember: We have it—can get it—or it isn't made!! Mail your order today.

DEALERS TOOL SUPPLY
1327 Grand Ave. S. S. — Kansas City, Mo.

Brooks LOAD LUGGER

With Enclosed Type Container for handling refuse, waste, garbage, etc.



With TrucKrane Boom Attachment for handling and placing tile sewer pipe, etc.

Use this versatile equipment on your truck chassis for hauling and dumping detachable buckets, filled with any bulk materials. Saves time, conserves trucks and helps overcome manpower shortage.

Write for Catalog No. 44.

507 Davenport Road, Knoxville 8, Tenn.

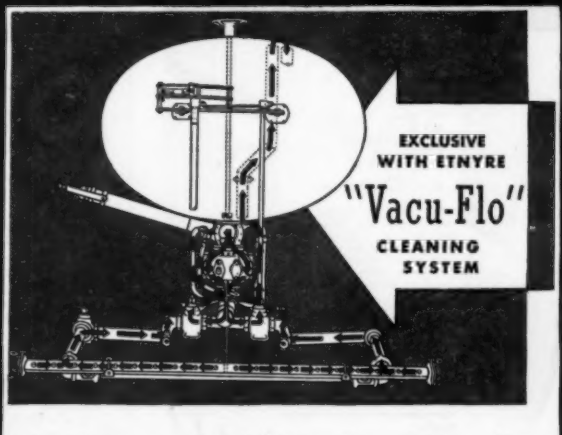
Distributors in All Principal Cities

Brooks EQUIPMENT & MFG. CO. KNOXVILLE TENNESSEE

ETNYRE

"Black-Topper"

BITUMINOUS DISTRIBUTORS



Just three quarts of flushing oil needed to clean pump, spray bar, valves, strainer and lines! After spraying, all material returns to tank, is not left to clog lines and spray bar. No waste; no need to clean between loads—just at night after last load!

E. D. ETNYRE & CO., Oregon, Illinois

Front End Loaders for Industrial Tractors

Write for Catalog

Elkhart White Mfg. Co. Indiana

BUY MORE BONDS

DOLGE WEED-KILLER DOES ALL THREE

KILLS THE TOPS

KILLS THE ROOTS

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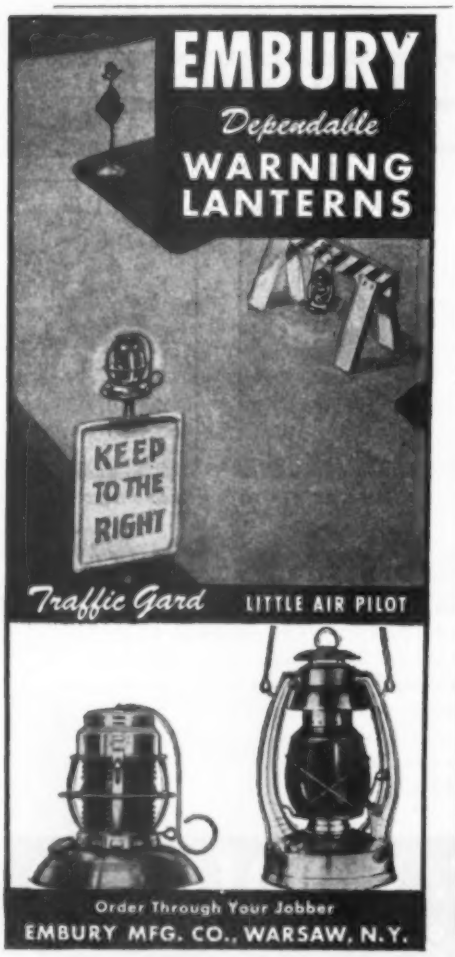

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